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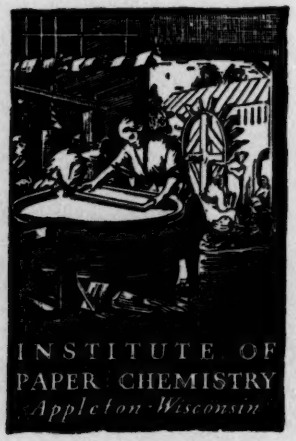
BULLETIN

OF

THE INSTITUTE OF PAPER CHEMISTRY



AFFILIATED WITH

LAWRENCE COLLEGE

APPLETON, WISCONSIN

LIBRARY NOTES

JULY • 1951

Volume 21 Number 11

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Books and Pamphlets Added to the Library During June

BIOGRAPHY

WHO'S WHO in commerce and industry. 7th international ed., including the Catalog of selected principal businesses, which by Marquis locator indexing provides reference from listed companies to career sketches of their ranking executives. Chicago, The A. N. Marquis Co. [c1951] 1355 p.

CHEMISTRY, ORGANIC

BEILSTEIN, FRIEDRICH KONRAD. Beilsteins Handbuch der organischen Chemie. 4. Auflage. Zweites Ergänzungswerk, die Literatur von 1920-1929 umfassend, herausgegeben und bearbeitet von Friedrich Richter. Berlin, etc., Springer-Verlag, 1951. 14. Band. 654 p.

ORGANIC REACTIONS. Roger Adams, editor-in-chief. New York, Wiley [c1951] v. 6. 517 p.

ENGINEERING—BIBLIOGRAPHY

The ENGINEERING INDEX, 1950. New York, Engineering Index, Inc. [c1951] 1383 p.

FUEL

NORTHEASTERN WOOD UTILIZATION COUNCIL. Wood fuel; report of conference at Philadelphia, May 10, 1951. Bulletin no. 35. New Haven, The Council, 1951. 77 p.

PAPER—TESTING

BEHRENS, ROSEMARIE. Papier unter der Lupe; Papierprüfungen. Hannover, Verlag H. Osterwald, 1950. 75 p.

RESEARCH

AMERICAN SOCIETY FOR ENGINEERING EDUCATION. *Engineering College Research Council.* Review of current research and directory of member institutions. [Ed. by John I. Mattill. Atlanta, Ga., Georgia Institute of Technology] 1951. 244 p.

SCIENTIFIC SOCIETIES

UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION. Directory of international scientific organizations. [Unesco—Publication 619] Paris, Unesco [c1950] 224 p.

SOUTH—ECONOMIC CONDITIONS

HOOVER, CALVIN B., and RATCHFORD, B. U. Economic resources and policies of the South. New York, The Macmillan Company [c1951] 464 p.

STRAINS AND STRESSES

HETÉNYI, M., ed. Handbook of experimental stress analysis. New York, Wiley [c1950] 1077 p.

TRADE DIRECTORIES

LYRHOLM, T. L., comp. Handbook of the northern wood industries, 1950. Timber-woodpulp-paper. Sweden-Norway-Finland. 7th ed. Stockholm, A.-B. Svensk Trävaru-Tidning [c1950] 1408 p.

ULTRASONICS

AMERICAN SOCIETY FOR TESTING MATERIALS. Symposium on ultrasonic testing, presented at the 52nd annual meeting, American Society for Testing Materials, Atlantic City, N.J., June 28, 1949. Special technical publication no. 101. Philadelphia, The Society [c1951] 133 p.

WATER

CARHART, ARTHUR H. Water—or your life, foreword by Jay N. Darling. Philadelphia, Lippincott [c1951] 312 p.

LINSLEY, RAY K., JR., KOHLER, MAX A., and PAULHUS, JOSEPH L. H. Applied hydrology. New York, McGraw-Hill Book Co., 1949. 689 p.

WATER—POLLUTION

GREAT BRITAIN. *Department of Scientific and Industrial Research. Water Pollution Research Board.* Report of the Water Pollution Research Board, with the report of the director of Water Pollution Research for the year 1949. London, H. M. Stationery Office, 1950. 48 p.

Survey of Periodical Articles

The following are abstracts of opinions expressed by writers in the technical journals. The Institute of Paper Chemistry takes no responsibility for the opinions here summarized.

ADHESIVES

GABRIEL, ARTHUR E. Packaging adhesives. Frontier 14, no. 2: 10-14, 19 (June, 1951).

Some of the latest developments in the field of adhesives and coating compositions and their influence on packaging are described. The properties and applicability of asphalt, polyethylene, thermosetting resins, animal glues, casein, synthetic rubbers, and polyvinyl acetate emulsions are reviewed. The availability and selection of adhesives are also discussed briefly. 3 figures. M.W.

ADVERTISING

STRAKER, E. J. Lettering in package design. Brit. Packer 13, no. 5: 28-30 (May, 1951).

The lettering on a package or advertisement is very important to the overall appearance and the impression left with the client. Two requirements of lettering are legibility and suitability. Factors which influence legibility include: the relative proportions of the letters, the design of separate letter forms, familiarity, size, and spacing. Important points to consider with regard to each of these factors are discussed, and the author warns against the excessive use of decorated type faces, the danger of letter forms that "date" in work of a permanent nature, and overcrowding of the letters. The importance of using a style of lettering which will attract the particular section of the public to which the product will make an appeal is pointed out. 4 figures. M.W.

AIR FILTERS

CAMBRIDGE CORPORATION, *Syracuse, N.Y.* Air filter passes only one particle where conventional types pass 1000 to 3000. Chem. Processing 14, no. 6: 100-1 (June, 1951); *cf.* B.I.P.C. 21: 32.

Reference is made to the high efficiency of paper-asbestos sheets folded in accordion fashion and fitted into a frame for the removal of fine dust particles from the air. 1 table and 1 figure. E.S.

STAFFORD, EARL, and SMITH, WALTER J. Dry fibrous air filter media; performance characteristics. Ind. Eng. Chem. 43, no. 6: 1346-50 (June, 1951).

Highly efficient air filter media have been developed for both practical air cleaning and analytical work. Two types which have proved to be most successful are asbestos-containing papers and pads or mats of very fine glass fiber. Asbestos papers are made of cellulosic fibers 10 to 30μ in diameter interspersed with asbestos fibers which vary from 1 to 2μ to those below visibility under the optical microscope. The glass-fiber filters are relatively thick (0.5 to 1 in.), but they possess the advantage of being fireproof. Low-ash cellulose papers are used for atmospheric sampling when the filtered material is to be evaluated by chemical or spectrographic analysis. The chief

difficulty with these filters is the presence of small openings, called pinholes. The efficiencies of these types of filters have been determined by testing with particles of artificial smokes or aerosols 0.3μ in diameter and with naturally occurring atmospheric dust particles which range between 0.1 and 1μ in diameter. The efficiency represents the ratio, multiplied by 100, of the number of particles which pass the filter and the actual number in the entering air. Asbestos paper proved to be the most efficient, and the efficiency against atmospheric dust increased with time. Efficiencies of ash-free paper against submicron particles were low but improved with increasing air velocity. Comparative tests with liquid aerosols and atmospheric dust agreed within reasonable limits of error. 2 tables and 8 figures. M.W.

ASSOCIATIONS

BRITISH PAPER AND BOARD MAKERS' ASSOCIATION. Paper industry in 1950. World's Paper Trade Rev. 135, no. 14: 974, 976, 979-80 (April 5, 1951); Paper-Maker (London) 121, no. 4: 250-2 (April, 1951).

Excerpts from the annual report of the Association are given, in which the conditions in the British paper and board industry during 1950 are reviewed; statistical data for consumption of materials, paper and board production, and exports and imports are included. 5 tables in the first reference. E.S.

BRITISH PAPER AND BOARD MAKERS' ASSOCIATION. *Technical Section.* B.P. & B.M.A. Technical Section. Paper-Maker (London) 121, no. 4: 258-62, 264-7 (April, 1951); *cf.* B.I.P.C. 21: 608.

These excerpts from the annual report of the Technical Section for 1950 are more extensive than those previously given and also include general activities and reports of the various divisions. E.S.

MACDONALD, R. G. The establishment of a local section. Tappi 34, no. 6: 87-90A (June, 1951).

On the occasion of presenting the charter to the Lake Erie Section, the history of the Technical Association of the Pulp and Paper Industry and its local sections is reviewed. E.S.

MACDONALD, R. G. A local section in the making. Tappi 34, no. 6: 93-5A (June, 1951).

The author discusses the factors which a group should consider as it approaches a local section status. The talk was given at the first regular meeting of the Southeastern Pulp and Paper Society, held on May 4, 1951 in Macon, Ga. The national organization plays a restrained part in the early days of a new organization because the local group needs to develop and exhibit a power of survival. The expectation of survival is greatest when a local group has competent leadership. E.S.

BACTERIOLOGY

HAJNY, GEORGE J., GARDNER, C. H., and RITTER, GEO. J. Thermophilic fermentation of cellulosic and lignocellulosic material. Ind. Eng. Chem. 43, no. 6: 1384-9 (June, 1951).

Research was undertaken on thermophilic cellulose bacteria in order to

find new methods for the utilization of waste wood. A thermophilic culture of cellulose bacteria isolated from garden soil was found to ferment a wide range of carbohydrates, comprising the simple sugars, hemicellulose, holocellulose, cellulose, and part of the cellulose in untreated wood. The main products of the fermentation were acetic, butyric, and lactic acids in yields approximating 50% of the carbohydrates consumed. Carbohydrate material in the untreated wood was not fully utilized. The yield of acids calculated as acetic acid from untreated sweetgum sawdust was 15.9%, based on the weight of the dry wood. In sweetgum wood previously given a mild acid hydrolysis, the yield of organic acids calculated as acetic acid was 26.4% of the wood. Pretreatment of delignified cellulose with dilute acid at high temperatures decreases the rate of fermentation of the residual cellulose. Studies on the viscosity and α-cellulose content of the cellulose residue at various stages of the fermentation strongly suggest a gradual shortening of the cellulose chain rather than a random splitting of the cellulose molecule. Contrary to much of the reported work in this field, it has been shown that wood can be attacked by micro-organisms to produce useful products. 6 tables, 4 figures, and 16 references. E.S.

BAGASSE

BUSINESS WEEK. In Peru, sugar cane evolves into paper. Business Week no. 1132: 164-6 (May 12, 1951).

Brief reference is made to a process developed by W. R. Grace & Co., Peruvian sugar refiners, for converting bagasse into paper and board. The waste is sun dried in the sugar cane fields, then shipped to the paper mill at Paramonga, which turns out 16,500 tons of various papers and boards yearly; last summer even newsprint was made from bagasse to prevent some of Peru's leading newspapers from closing. A factory at Lima converts the products to bags and boxes. Sandy Hill Iron & Brass Works has recently been authorized to manufacture and license the machinery which Grace has developed. 4 illustrations. E.S.

BAMBOO

JOGLEKAR, M. H., and DONOFRIO, C. P. Dissolving pulp from bamboo. Tappi 34, no. 6: 254-61 (June, 1951).

The findings in this investigation demonstrate that a highly satisfactory alpha pulp which may be utilized for dissolving purposes can be manufactured from bamboo through a series of chemical treatments consisting of acid prehydrolysis, sulfate digestion, and multistage bleaching. By virtue of its chemical composition, i.e., high fractions of pentosans and silica, bamboo posed many difficulties in pulp purification when the conventional pulping procedures were employed as initial steps in alpha-pulp preparation. Alkaline pulps (soda and sulfate) exhibited high residuals of the above-mentioned constituents which resisted removal in many of the wide array of methods established for pulp purification. The matter of pentosans suggested a strong similarity between the alkaline bamboo pulps and the alkaline pulps produced from the more common American hardwoods. Although low in residual pentosans, the bamboo sulfite pulps (prepared under carefully selected conditions) were found unsuitable for subsequent purification because of their highly degraded nature, high silica content, and inferior bleaching characteristics. Acid prehydrolysis of bamboo was found to be highly effective in facilitating the removal of pentosans and silica in the subsequent sulfate digestion stage. Pulps produced in this manner were bleached to high brightness levels with ease and with low total consumption of chlorine (less than 4%) in two or three stages. Because of the high degree of purity

secured in these pulps, the conventional alpha treatment was unwarranted. The suitability of sulfuric acid as the hydrolyzing agent and its re-use in the prehydrolysis of bamboo are discussed. Excellent acetate sirups of low turbidity and clear films were prepared from the bleached, prehydrolyzed bamboo pulps. 9 tables, 3 figures, and 13 references. E.S.

BLEACHING—GROUNDWOOD

OTTAR, HALDOR. The bleaching of groundwood pulp. Norsk Skogind. 5, no. 4: 109-12, 114-17 (April, 1951). [In Norwegian; English summary]

The present article is based upon a study of the literature, bleaching of Scandinavian pulps on a laboratory scale, and a visit to American bleach plants. The color and brightness of groundwood pulps are discussed in connection with spectral reflectivity diagrams of three different Scandinavian wood pulps taken with a Hardy spectrophotometer. The data indicate that an oxidizing groundwood bleach will never equal the results of a highly bleached chemical pulp, because the absorption in the blue and blue-violet range is too strong, and no improvement can be expected as long as the residual lignin does not undergo any change with these bleaching procedures. Typical peroxide bleach plants in the United States and Canada are described, and approximate costs for peroxide bleaching in the United States and Norway are given. 1 table, 12 figures, and 11 references. E.S.

PREMO, RICHARD A. Peroxide bleaching of groundwood and sulphite pulps. Tappi 34, no. 6: 270-2 (June, 1951); *cf.* B.I.P.C. 21: 102.

The modernization of the Gould Paper Co. mill and the conversion of this mill from the manufacture of newsprint to the production of higher-grade papers was completed early in 1950. For the manufacture of the new line of paper products facilities were required for bleaching groundwood and sulfite pulp. Since peroxide bleaching was known to be applicable for bleaching both pulps to the desired brightness, a new peroxide bleachery was designed and installed for bleaching groundwood and sulfite pulps, either separately or in mixtures. This modern peroxide bleachery is operating at a consistency of 12 to 15% with a capacity for bleaching 100 tons of groundwood or 130 tons of sulfite pulp per day. With 2% sodium peroxide, brightnesses of 70 to 71 are obtained on groundwood alone and on mixtures of groundwood and sulfite pulp, whereas on sulfite pulp the bleached brightness is approximately 75. The percentages of groundwood and sulfite pulp in the mixture are controlled at will for the production of a range of papers, including high-grade printing papers and allied grades. Automatic equipment for the continuous preparation of the peroxide solution, a novel feature in this bleachery, has been giving good performance in day-to-day operation. Plans for the bleachery were well considered; careful attention was given to essential details in the choice of proper equipment and in the bleachery layout for ease of operation. The performance of the bleachery has been excellent from the start about a year ago. 3 figures. E.S.

BLEACHING—SULFATE

ANON. Harmac bleach plant begins production. Pulp Paper Mag. Can. 52, no. 6: 91-2 (May, 1951); *cf.* B.I.P.C. 21: 682-3.

A brief description of the installations of the new bleach plant is given. 5 illustrations. E.S.

BOARD MILLS

ANON. Oldest mill modernized and expanding. Paper Mill News 74, no. 24: 10 (June 30, 1951).

The Stony Brook Paper Co., Waltham, Mass., is the oldest operating mill in the United States; the original mill was built in 1798 by Nathan Upham. The history of the mill is outlined briefly; the present production of the mill is principally tube board for the American Paper Products Co. in Philadelphia, which bought the Stony Brook mill in 1947. However, the mill can also produce quality plain chip and newsboards, car lining, and colored specialties. Recent improvements have increased the daily output of the mill from seven to more than 18 tons per day. E.S.

BOARD SPECIALTIES

PAP-R-TIN CORPORATION, *Philadelphia.* New paperboard pie plate. Fibre Containers 36, no. 6: 116-18 (June, 1951).

A new one-use pie plate is made of white lined newsboard rather than the customary pulpboard, and is coated with a special composition which renders the plate completely greaseproof. It can be used in baking the pie as well as for the continuing container through all operations, including sale to the consumer. It, therefore, eliminates the use of tin plates and the risk of breakage through transfer; the greaseproof coating tends to improve the quality of the pie by insuring freshness and reducing the thickness of the bottom crust. 1 illustration. M.W.

BOARD TESTING—PHYSICAL

BROUGHTON, GEOFFREY, CHU, CHAUNCEY, and KASWELL, ERNEST. New technique for measuring corrugated adhesion. Fibre Containers 36, no. 6: 46, 48, 50, 55 (June, 1951).

The application of the Instron tensile tester (a constant-rate-of-elongation recording instrument) to the testing of the adhesive bonding of corrugated and linerboard is discussed. 10 figures. E.S.

CANADIAN PULP AND PAPER ASSOCIATION. *Technical Section. Board Committee.* The oil resistance of the surface of paperboard. Pulp Paper Mag. Can. 52, no. 6: 112-14 (May, 1951); *cf.* B.I.P.C. 19: 534-5.

The procedure and apparatus for the determination of the oil resistance of the surface of paperboard are described, including special precautions and a method for calibrating the Photovolt glossmeter Model 660-P which was adopted for the photoelectric determination of the end point. The specified procedure requires the use of an oil of known characteristics which may be obtained from the Pulp and Paper Research Institute of Canada, from where a viscosity-temperature correction chart for the standard oil may also be obtained. 1 table and 2 figures. E.S.

MEAD BOARD SALES, INC., *Cincinnati.* New motorized Blum crush tester. Fibre Containers 36, no. 6: 70, 72 (June, 1951).

The Blum crush tester, first introduced in 1938, was redesigned as a motorized unit with a capacity to test 11,500 lb./sq. ft. in a flatwise crush. The machine can withstand pressures much in excess of this amount, and the cast iron frame assures adequate strength to meet the increased stresses in-

curred in testing the more rigid corrugated board made today. It is claimed that under pressure the corrugations cannot roll or slip (*cf.* B.I.P.C. 21: 684-5), only crush; the design of the unit permits the determination of the initial or primary crush, where failure occurs first, and the final crush, where failure is complete. 2 illustrations. E.S.

S&S CORRUGATED PAPER MACHINERY COMPANY, *Brooklyn.* S&S scuff tester. Fibre Containers 36, no. 6: 82-3 (June, 1951).

The construction and operation of the instrument are described, which is a laboratory instrument invented by Fred H. Benjamin of F. J. Kress Box Co. for testing the resistance of linerboard to scuffing and peeling. Two surfaces of linerboard are rubbed together under reproducible conditions with a predetermined amount of pressure, and the cycles are counted, so that comparative data result. 3 illustrations. E.S.

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY. Forming structural-type boards for physical tests of pulp. Tappi 34, no. 6: 118-21A (June, 1951).

The text of TAPPI Suggested Method T 1001 sm-51 is presented; the method is designed for the preparation of test board for the evaluation of pulps for the purpose of making structural-type boards. The test boards are prepared at four varying densities, and their physical properties are determined by procedures specified in TAPPI Tentative Standard T 1000 m, Commercial Standard CS 42-94, and Federal Specification LLL-F-321b. The subject of sizing has not been covered; however, the stock may be sized or not sized. The apparatus and procedures are described in detail. 3 figures. E.S.

BUYING

DAY, FREDERICK T. Paper conversion and usage. No. 4. Paper buying and specification. World's Paper Trade Rev. 135, no. 3: 178, 183 (Jan. 18, 1951).

Useful directions are given for specifying all important requirements which are essential to the successful conversion of paper. When it is required for an untried job, the papermaker, inkmaker, blockmaker and, if necessary, the manufacturer of the printing press should be consulted and taken into confidence. E.S.

MORRIS, CHARLES V. A cardinal rule of effective order writing —be specific. Paper & Paper Products 92, no. 18: 1, 24-5 (June 5, 1951).

The author emphasizes the need for efficient order writing and thorough itemizing of every detail of possible importance. Examples are given to illustrate how the failure to specify the apparently most inconsequential details may result in costly and annoying situations. A point-by-point check list is included to help buyers of sheeted paper in writing correct orders, including quantity, size and weight, grade, color, finish, grain, trimming, packing, delivery, shipping, and special requirements. 1 order form. E.S.

CELLULOSE—HEAT OF CRYSTALLIZATION

WARD, KYLE, JR., and REEVES, RICHARD E. Heat of crystallization of cellulose. J. Polymer Sci. 6, no. 6: 778 (June, 1951).

The authors point out that the value (4100 cal./mole) obtained by Calvet and Hermans (*cf.* B.I.P.C. 21: 386) for the heat of crystallization of cellulose is based on the premise that the heats of crystallization are the same for the two cellulosic materials employed, cotton linters and rayon. Since this may not be the case, little reliance should be placed on the value unless a third equation should confirm the equivalence of the two values. It is suggested that a sample with the same crystal structure of either linters or rayon but with a different degree of crystallinity might be used to determine the heat of crystallization of both native and regenerated cellulose and give a definite answer as to which modification is more stable. M.W.

CELLULOSE—OXYCELLULOSE

ASTWOOD, E. B., RABEN, M. S., PAYNE, R. W., and GRADY, A. B. Purification of corticotropin with oxycellulose. J. Am. Chem. Soc. 73, no. 6: 2969-70 (June, 1951).

Experiments with oxidized cellulose have shown it to possess a much larger capacity than unoxidized cellulose for the adsorption of corticotropin. It proved to be more selective for the active component in the extracts, and its use provided a simple single-step method for the preparation of highly active material in virtually quantitative yield. The use of oxycellulose as a fractionation medium for other purposes, where compounds are not amenable to separation with ion-exchange resins, is indicated. 1 table and 4 footnotes. M.W.

CELLULOSE—SORPTION

ESCARD, M. Fixation of water in cellulose. Bull. assoc. tech. ind. papetière 5, no. 3: 145-67 (April, 1951). [In French]

A critical discussion of the sorption of water by cellulose is presented, including the work of such investigators as Peirce, Sheppard, Newsome, Brunauer, Neale, Purves, Mark, Hermans, Kiessig, and others. Possible future work at the Laboratoire Central des Services Chimiques de l'Etat is outlined very briefly. 4 figures. L.E.W.

PAYNE, R. W., RABEN, M. S., and ASTWOOD, E. B. Extraction and purification of corticotropin. J. Biol. Chem. 187: 719-31 (1950).

A procedure for the extraction of corticotropin obtained from pig pituitary powder is presented. It was found that a tenfold concentration of corticotropin resulted from the adsorption of the acetic acid extract of the pituitary powder on a fiftyfold weight of powdered cellulose, and that the extract could subsequently be eluted with 0.1 *N* hydrochloric acid. 3 tables, 3 figures, and 28 references. M.W.

CELLULOSE ETHERS

TIMELL, T. E., and PURVES, C. B. A study of the initial stages of the methylation of cellulose. Svensk Papperstidn. 54, no. 9: 303-32 (May 15, 1951). [In English]

A new method is proposed, particularly for the study of the earlier stages of cellulose reactions. Samples taken at suitable time intervals are nitrated as completely as possible in a nondegrading nitration mixture and then fractionated by both fractional-precipitation and fractional-solution methods. The fractions are analyzed with regard to chemical composition and D.P.

In this manner the distribution of the original substituents may be estimated both with respect to the different macromolecules and the fine structure of the fiber. The methylation of cellulose with dimethyl sulfate and sodium hydroxide was investigated according to this procedure; seven samples with degrees of substitution (D.S.) ranging from 0.1 to 0.6 were prepared from cotton linters, nitrated, and fractionated. A fraction of lowest molecular weight was found to dissolve during the nitration, and a similar fraction was also removed when the original methylcellulose was extracted with various solvents. A comparison between the results noted in the fractionations of the nitrated, original and mercerized celluloses on the one hand, and a nitrated, methylated specimen on the other, showed that the fractionation of the latter took place principally according to the length of the chains. It was found to be unnecessary to refractionate the primary fractions of the methylcellulose nitrates when the sole purpose was the establishment of the distribution of the substituents. The results from the fractional-precipitation experiments showed that the material of lowest molecular weight had a rather high degree of methyl substitution, which rapidly decreased with increasing D.P. to a very low and nearly constant value for the medium- and long-chain fractions. In the later stages of the methylation the decrease in the D.S. became more gradual and, at the same time, the methoxyl content of the longer chains gradually increased. The fractional-solution method gave approximately the same results and also corroborated the conclusions to be drawn from the extraction experiments, i.e., that the bulk of the methylation had occurred on short-chain material located in the easily accessible, disordered regions. A value for the nonuniformity of the methylcelluloses with regard to the distribution of the substituents could be estimated graphically and was found to decrease slowly as the reaction proceeded. The methylation remained intermicellar throughout the range studied, in agreement with the solubility properties of the samples. The assumption that the accessible regions of the cellulose were the principal sites of substitution led to some conclusions with regard to the fine structure of cotton linters; these were all in agreement with results from recent investigations. In conclusion, two commercial, alkali-soluble methylcelluloses were nitrated and fractionally precipitated. They were found to possess a nearly uniform distribution of substituents, which indicated their formation by intramicellar reaction. The methylation of cellulose thus begins as an intermicellar reaction which can, however, be changed to an intramicellar one under suitable external conditions. 47 tables, 26 figures, and 86 references. E.S.

CHEMICAL TESTING—CELLULOSE—ACCESSIBILITY

ALGAR, WILLIAM H., GIERTZ, HANS WILHELM, and GUSTAFSSON, ANNE-MARIE. Fiber structure and pulp properties. 1. A working hypothesis. Svensk Papperstidn. 54, no. 10: 335-44 (May 31, 1951). [In Swedish; English and German summaries]

A modified Nickerson hydrolysis method (*cf.* B.I.P.C. 11: 395) has been used to determine the easily accessible percentage of cellulose of a wide range of cellulosic materials. The amounts vary over quite a wide range for the materials investigated, whereas the rate of dissolution (I) of the difficultly accessible fractions is constant for all pulps from a given wood, and varies only slightly for different wood species. (I), however, increases, when the cellulose sample is subjected to mechanical treatment, such as dry disintegration. A good correlation has been established between Nickerson easily accessible cellulose and γ-cellulose for a number of sulfite and sulfate pulps. It is assumed that these two determinations measure essentially the same constituent in wood pulps. According to present concepts, cellulose fibers consist of a system of micelle cords with an amorphous filler substance of a

hemicellulosic nature (interfibrillar substance). It is claimed that the easily accessible fraction measured by hydrolysis and γ-cellulose are closely related to this interfibrillar substance. Hence, the micelle cords would represent the difficulty accessible fraction and, according to the results of investigations by Hägglund and co-workers (*cf.* B.I.P.C. 19: 56-7) and Sundman (*cf.* B.I.P.C. 18:360), seem to consist of pure cellulose. The authors contend that the results of the Nickerson hydrolysis should not be regarded as the measurement of crystalline and amorphous fractions, but rather of the materials of which the micelle cords and interfibrillar substance consist. It has been proved that the amount of difficultly accessible material (referred to the basis of the original wood) does not change during sulfite cooking, unless strongly hydrolyzing conditions are used as in cooking rayon pulps. The sum of α- and β-cellulose shows a similar behavior. No β-cellulose is found in holocellulose or semichemical pulps; it occurs first in ordinary sulfite pulps and, to a greater extent, in rayon pulps. The authors claim that β-cellulose does not exist as such in the native wood, but that it is formed from the resistant α-cellulose by either hydrolytic or oxidative action. A simple relationship exists between the amount of easily accessible material and water sorption, except for holocellulose and hot alkali-refined pulp. On the other hand, an excellent correlation for all pulps is obtained with the determination of bound water in wet pulps using the thiosulfate method of Champetier (*cf.* Heuser, The chemistry of cellulose. New York, Wiley, c1944, p. 47-9). The strength properties of papers prepared of both unbeaten pulps and those beaten to 45° S.-R. and opacity exhibit a good linear relationship with the easily accessible fraction. Opacity increases with a decrease in the latter; this is probably due not only to a reduced number of fiber-to-fiber bonds but also to the formation of capillary spaces in the fiber. The increase in strength properties with an increase of the easily accessible fraction results from the interfibrillar cementing effect of the amorphous hemicellulosic material, although the influence of fiber strength must also be taken into account. The interfibrillar substance therefore plays an important role in determining the papermaking properties of pulps. Ultrasonic beating experiments have shown that a hot alkali-refined pulp can be fibrillated, despite the fact that it contains very little of the easily accessible material; however, it does not show the same strength as an unbeaten pulp with a large amount of this fraction. These facts stress the importance of the cementing hemicellulosic materials with regard to sheet strength. 4 tables, 12 figures, and 13 references. E.S.

CHEMICAL TESTING—PULP—ACID NUMBER

ANT-WUORINEN, OLLI. Determination of carboxyl groups in cellulose. Paper and Timber (Finland) 33, no. 4a: 105-14; no. 5: 174-81 (Special issue, April, May, 1951). [In English]

A new method for determining the carboxyl content of unoxidized cellulose is presented. The first step in the procedure is to free the cellulose carboxyls from their possible salt formations by the use of a concentrated aqueous carbon dioxide solution. Because the titration interval in the determination is close to pH 7 where atmospheric carbon dioxide could interfere, the entire determination is carried out in a nitrogen atmosphere. The second step consists of an ion-exchange reaction in which the cellulose is allowed to react with a sodium chloride solution until a constant pH is obtained. The hydrogen ions released from carboxyl groups during this reaction are then determined by titration with 0.001 *N* sodium hydroxide until the original pH of the sodium chloride solution (measured under nitrogen cover) is reached. The probable error of a single determination by this method in the carboxylic glucose number range of 200-2000 is less than ±1%. The effects of various experimental conditions are discussed, and it is established that the presence

of the cellulose fiber during the titration is not a source of error. 8 tables, 3 figures, and 6 references. M.W.

CHEMICAL TESTING—PULP—ALPHA CELLULOSE

DOERING, HELMUT. Theory and practice in the determination of α-cellulose. Das Papier 5, no. 7/8: 127-30 (April, 1951). [In German]

With reference to the determination of α-cellulose (I), the author emphasizes the importance of the orientation of the cellulose molecules in the micelles and the magnitude of the contact surfaces (II) between the fibers and mercerizing solution. The best method of preventing the increase in (II) during the washing operations after mercerization is discussed. The post-mercerization swelling with concomitant increase in (II) is best obviated by washing the filtered (I) successively with a salt solution, aqueous acid, and water, without the inclusion of an intermediate washing step with 17.5% sodium hydroxide as prescribed in the old Jentgen method. The use of sodium hydroxide should be limited to the mercerization process. 7 footnotes. L.E.W.

CHIPS

OLIVER, MURRY L. Compensating for chip moisture variations by chip weighing. Tappi 34, no. 6: 273-5 (June, 1951).

This investigation relates to the weighing of pine chips at the digesters in the sulfate cooking process. Moisture tests were made on 190 experimental cooks in the 3000-cu. ft. mill digesters. The weighing device substantiated the fact that with increasing moisture the chips are heavier and will pack more moisture-free wood per digester charge. It is shown how cooking tables may be designed with the aid of a weighing device so as to secure a close control of the ratio of alkali to moisture-free wood per digester charge. A discussion is presented of two methods of correcting for chip moisture variations: first, by maintaining a definite ratio of chip moisture to moisture-free wood; and second, by maintaining a definite ratio of digester liquid volume (chip moisture, weak black and white liquor volume) to moisture-free wood. 4 tables, 1 figure, and 4 references. E.S.

COLORIMETRY

MIDDLETON, W. E. KNOWLES, and SANDERS, C. L. The absolute spectral diffuse reflectance of magnesium oxide. J. Optical Soc. Am. 41, no. 6: 419-24 (June, 1951).

The published values of the spectral diffuse reflectance of magnesium oxide indicate that it should reflect more highly in the red than in the blue. By the use of a modification of the method described by Preston, the absolute value of this quantity was measured between $\lambda = 0.24\mu$ and $\lambda = 0.85\mu$. A very carefully prepared surface of magnesium oxide on silver has a reflectance of about 0.98 at $\lambda = 0.54$, where there is a very flat maximum. The reflectance of a fresh surface falls to less than 0.96 at 0.4μ, but exposure to strong ultraviolet light bleaches it, the final result being a reflectance increasing continuously from the near-infrared to about 0.4μ, where it begins to fall sharply, reaching 0.96 at about 0.25μ. A sphere lined with such a bleached surface raises the color temperature of Planckian radiation a little, and the observed color agrees favorably with that predicted from the new results. It is believed that these results are reliable to ± 0.002 from $\lambda = 0.4\mu$ to $\lambda = 0.7\mu$, but different surfaces prepared with equal care may differ in reflectance by at least 0.005. The bleaching is presumed to be caused by the decomposition of magnesium nitride. 1 table, 10 figures, and 10 footnotes. E.S.

CONTROLLED MATERIALS PLAN (CMP)

ANON. Requirements of CMP regulations. Southern Pulp Paper Manuf. 14, no. 6: 16, 20, 22, 24, 71 (June, 1951).

The fundamentals, scope, and requirements of the Controlled Materials Plan are outlined; it will become effective July 1, 1951. Its purpose is to assure a balanced flow of essential production and construction with a minimum of interference to the civilian economy. E.S.

CORROSION

HAIR, J. C., and DUSKIN, A. W. The effect of silicates on digester corrosion. Tappi 34, no. 6: 252-4 (June, 1951).

In an attempt to decrease the corrosion rate in its digesters, Crossett Paper Mills added sodium silicate and high-silica clays to the liquor system with the anticipation that a protective scale would be formed in the digesters, and corrosion thereby inhibited. At the conclusion of a nine-month test, there had been no formation of a high-silica protective scale, nor had there been any reduction in the corrosion rate. 2 tables, 1 figure, and 3 references. E.S.

TEEPLE, H. O. Considerations of current corrosion problems in the pulp and paper industry. Southern Pulp Paper Manuf. 14, no. 6: 50, 52, 54 (June, 1951); Pulp & Paper 25, no. 6: 88-9; discussion: 89, 102 (June, 1951); Paper Mill News 74, no. 27: 10, 12, 14 (July 7, 1951).

The solution of corrosion problems in pulp and paper mills under present-day conditions is discussed under the headings: materials of construction, changes in operating conditions, and the attitude of mill management. E.S.

TEEPLE, H. O. Progress report of the Alkaline Digester Corrosion Subcommittee. Tappi 34, no. 6: 80A, 82-3A (June, 1951); *cf.* B.I.P.C. 21: 462.

A summary of digester-questionnaire data is presented under the headings: kraft—stationary digesters, kraft—rotary digesters, soda digesters, Canadian mills, and general comments. The data are probably not conclusive, but are presented because of the considerable interest of mills in digester-corrosion problems. 1 table. E.S.

COST—ACCOUNTING

WOOD, FRANK E. Budgetary control in the pulp and paper industry. Can. Pulp Paper Ind. 4, no. 6: 134, 136-8, 140, 142 (June, 1951).

The author discusses the special problems of budgetary control in the pulp and paper industry in general and with particular reference to the new sulfate mill in Marathon, Ont., Canada, which is a relatively new venture built under wartime conditions, where operations have not yet reached maximum stability and will probably not do so for several years. No attempt is yet made to operate this mill to a budget, but management is advised of the extent and reason for variances. The company relies on its standard costs to signal exceptional variances, so that the operating management is able to control costs within the operation and construction programs. Mention is made of the interesting variation caused by the seasonal employment of bush workers in woodlands operations. E.S.

CROTALARIA

ERNST, A. J., SUTCLIFFE, H. M., and ARONOVSKY, S. I. Agricultural residue pulps—Crotalaria pulps. Tappi 34, no. 6: 247-51 (June, 1951).

Crotalaria is one of the more important leguminous crops grown on the sandy soils of southeastern United States for erosion control. The two most common varieties, *Crotalaria mucronata* and *Crotalaria spectabilis*, produce high yields of seed and up to 10 tons of green or 2 tons of dry forage per acre. A number of pulping trials were made on these stalks, using the neutral sulfite and kraft processes. Crotalaria required more cooking chemicals and generally longer cooking periods than are necessary to pulp wheat straw. Lower yields of pulp were obtained from crotalaria than from wheat straw, but the crotalaria pulps were stronger, particularly in tear resistance and folding endurance. In general, the kraft process produced stronger pulp than the neutral sulfite process, but the kraft pulp yields were lower. These preliminary experiments indicate that, from a technological standpoint, crotalaria has good possibilities as a raw material for pulp and paper manufacture. Economic considerations, however, will undoubtedly be the controlling factors in the possible utilization of crotalaria for pulp and paper production. 3 tables, 2 figures, and 4 references. E.S.

DIGESTERS—FILLING DEVICES

ROCHE, A. J. Chip distributor, a gadget competition entry. Pulp Paper Mag. Can. 52, no. 6: 115 (May, 1951).

A chip distributor and packer is described, which consists of an arrangement of two orifice plates and small steam nozzles by the use of which it is claimed that the pulp yield per cu. ft. of digester can be increased 27.5%. 1 illustration. E.S.

ELECTRIC PRECIPITATORS

SPROULL, WAYNE T., and NAKADA, YOSHINAO. Operation of Cottrell precipitators; effects of moisture and temperature. Ind. Eng. Chem. 43, no. 6: 1350-8 (June, 1951).

The performance of Cottrell precipitators is grossly affected by variations in the temperature or moisture content of the gases being treated. Wolcott partly explained this in 1918, pointing out that moisture reduced the electrical resistivity of the precipitated dust layer and prevented it from acquiring too great a charge. The present experiments show that most dusts reach their maximum resistivity at about 200 to 250°F., and that moisture reduces the resistivity, especially at temperatures below this peak value. This behavior is explained, and Wolcott's theory of excessive charging is developed mathematically. Moreover, experiments with a precipitator readily reveal that its electrical characteristics are sensitive to moisture and gas temperature, even when the precipitator and gas are both clean and free from dust. This direct effect is sometimes as important as the indirect effect via the dust resistivity. In general, this study indicates that high or low temperatures are better for Cottrell operation than intermediate temperatures around 200°, and that above 500° the effect of moisture is mostly direct, whereas below this temperature the predominating effect is indirect. 14 figures and 8 references. E.S.

ELECTROPLATING

FESCOL LIMITED, *London*. Protection and restoration of machine parts. World's Paper Trade Rev. 135, no. 15: 1048, 1050 (April

12, 1951); Paper & Print 24, no. 2: 181-2 (Summer, 1951); *cf.* B.I.P.C. 21: 621.

The possibilities of the Fescol process of cold electrochemical deposition of (principally) nickel and chromium for the repair and treatment of paper-making machinery, particularly rolls, are emphasized. 1 illustration. E.S.

FIBER—STRUCTURE

ROELOFSEN, P. A. Contradictory data on spiral structures in the secondary cell wall of fibers of flax, hemp, and ramie. Textile Research J. 21, no. 6: 412-18 (June, 1951).

Published data concerning the spiral structure of flax, hemp, and ramie are contradictory, although there are no conflicting data on the direction of twist shown by the fibers on wetting or drying or on the optical behavior when studied under a polarization microscope. A reinvestigation of the spiral structure of the three fibers revealed that in flax there are not two, but three layers with different spiral structures, and the disagreement of the previous data was the result of the consideration of only two of the three possible layers. In all fibers the outer layer was shown to have a Z-spiral structure. In flax the middle layer has an S-, and the inner layer a Z-spiral structure. S-spiralled structures occurred in the inner layers of both hemp and ramie. If a third inner structure could be found in hemp and ramie, the conflicting data concerning these fibers would be understandable. 11 figures and 14 references. M.W.

FOAM

ROSS, SYDNEY. Foams. Gen. Elec. Rev. 54, no. 6: 37-8 (June, 1951).

A number of situations in which foaming presents a problem, including the manufacture of paper, oil and gas drilling, and high-altitude flying, are described. Foaming may slow production, damage the product, impair efficiency, and result in financial loss. Some types of chemicals are effective in the prevention of foaming. They vary widely in composition, but they are similar in surface activity and act either by producing a mechanical rupture of the film or by supplanting the original foaming agent at the liquid surface. M.W.

FOLDING BOXES

OTWELL, SAMUEL T. The folding carton. Fibre Containers 36, no. 6: 112, 114 (June, 1951).

The folding carton is most suitable for unit packaging because of its economy and versatility and because it offers protective features as well as a medium for attractive advertising. To make the most of these qualities in designing cartons, the boxmaker should have information concerning the size, weight, and value of the article to be packaged, the unit to be used, where the item will be sold, other packaging to be used, and the manner of filling the carton. M.W.

FORESTS AND FORESTRY

COWAN, T. A. Training of forest personnel in simple conservation measures. Pulp Paper Mag. Can. 52, no. 6: 132, 134 (May, 1951).

Since many bush workers spend the summer months on wood lots in the vicinity of timber limits with cut-over areas, they should be educated to the importance of fire prevention in young growth areas, as well as in merchant-

able areas. To accomplish this a program should be developed by the companies to be carried out in their camps during the winter which, through lectures, posters, films, etc., would demonstrate to the bush worker his part in forest conservation. M.W.

JOHNSON, VERNON E. A new era of forest management. Am. Pressman 61, no. 7: 29-35 (June, 1951); *cf.* B.I.P.C. 21: 622.

The practice of forest management and the complex operations behind the provision of pulp and paper mills with the necessary wood are explained, with particular reference to the woods operations in one of the 10 forest districts of the Canadian International Paper Co., with headquarters at Maniwaki in Quebec. It is emphasized that, with a good forest-management policy, trees can be considered a replenishable crop, and increased wood production (perhaps two to three times the present output of Canada's woodlands) can be achieved. This will require the best efforts and co-operation of industry, government, educators, science, and the average citizen. 4 illustrations. M.W.

ROBERTSON, REUBEN B. Pulpwood in your backyard. Southern Pulp Paper Manuf. 14, no. 6: 48, 50 (June, 1951).

The author outlines Champion's Asheville Basin plan for local woodlot owners near the company's Canton mill, which provides them with an attractive market for their pulpwood and helps them in practicing good forestry. Both woodlot owners and the pulp mill profit by this co-operative approach. E.S.

SMITH, GLENN E. Pulpwood cuttings in the poorer hardwood sites of New Jersey. J. Forestry 48, no. 12: 850-1 (December, 1950).

Forest management in some poor hardwood sites of New Jersey has been improved through the use of thinnings as pulpwood by a number of mills which produce roofing and siding compositions. The woodlots in which pulpwood thinnings have been made are the poorest of the upland oak sites, and the improvement cutting salvaged the worst of the defective material and opened up the crowns for the purpose of encouraging natural regeneration. After three years a satisfactory amount of new oak reproduction has become established, and indications are that the pulpwood market will make it practicable to carry on improvement cuttings in other similar low-quality stands. 1 table. M.W.

FUEL

CLARK, W. H. D. Investigation into properties of wood fuels. Pulp Paper Mag. Can. 52, no. 6: 103-4 (May, 1951).

It has been suggested that a comprehensive investigation into the properties of Canadian wood fuels should be made to establish the averages, and probable variations from these averages, of such properties as heating value, ultimate analysis, ash analysis, and fusion temperatures for both wood and bark of the various wood fuels generally used. The author suggests that such an investigation include the following: (1) a review of sampling and analytical methods and the establishment of a standard procedure, (2) an investigation of fusion temperatures of wood ash as related to actual operating difficulties, and the establishment of a standard testing procedure, (3) an analysis of each species from each area and the determination of average values, and (4) the publication of results for general use of all operators and manufacturers of steam-generating equipment. M.W.

GROUNDWOOD PULP

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY. *Empire State Section (Eastern District)*. Groundwood specialties. Tappi 34, no. 6: 110-13A; discussion: 113-14A (June, 1951).

The following three papers were presented: Anderson, Oscar, Jr. Preparation of groundwood for groundwood specialties, p. 110-11A; Davis, Clyde. Groundwood mill process control, p. 111-12A; Jacques, Herbert F. Bleached groundwood, p. 112-13A. The speakers then acted as a panel to answer questions from the floor. E.S.

GUMS AND RESINS

ISLIP, H. T., and MATTHEWS, W. S. A. Slash pine oleo-resin from British Honduras. Colonial Plant and Animal Prod. 1, no. 3: 217-22 (1950).

Tests of oleoresin obtained from slash pine trees (*Pinus caribaea* Morelet) in British Honduras are reported. The yield of oil was slightly low, but the oil was of good quality and could provide satisfactory yields of turpentine oil comparable to the American product. The rosin obtained from the sample was also similar to commercial American rosin. The properties of the rosin and turpentine oil are summarized. 2 tables. M.W.

MCILROY, R. J. Phormium gum. J. Chem. Soc.: 1372-3 (May, 1951).

A proximate analysis of purified gum from *Phormium tenax* (New Zealand flax) indicated its composition to be: 42.4% uronic anhydride (10.6% carbon dioxide), 45.0% anhydropentose (37% furfuraldehyde), 3.8% lignin, and 5% ash. Further tests showed that D-xylose is the only sugar present; therefore, the gum is a polyuronide which consists of D-xylose and D-glucuronic acid residues, comparable to *Phormium* hemicellulose (*cf.* B.I.P.C. 16: 223; 19: 760-1). The periodate consumption indicated a predominance of α-glycol residues in the xylose chain as in xylan. Phorium gum was very resistant to methylation and was degraded in the process. M.W.

HEATING (INFRARED)

ANON. Plant heating by infra-red heating jackets. World's Paper Trade Rev. 135, no. 22: 1605-6, 1611 (May 31, 1951).

A brief description of the Stabilag heating jacket is given, which is constructed from fiber-glass cloth in which a resistance wire is secured. The heat dissipation is such that the whole jacket surface rises to the operating temperature almost instantaneously when the heat is switched on. Each jacket is tailored for its particular purpose, ensuring a perfectly snug fit, which adds to its efficiency; a patented safety feature will prevent the rise of temperature above 550°C. (a temperature which the glass fabric will comfortably withstand) should the level of liquid in the vessel fall or the vessel boil completely dry. In addition to heating of flasks and beakers, the Stabilag jacket can be used for a variety of purposes, such as heating funnels and filtering equipment, valves, pressure and vacuum vessels, steel or rubber rolls for the paper industry, pump cases, dye pots, fractionating and distillation columns, the drying of textiles, etc. 5 figures. E.S.

HOURLIER, P. Results of several applications of infrared radiations in the paper industries. Bull. assoc. tech. ind. papetière 5, no. 3: 119-27 (April, 1951). [In French]

The application of infrared drying equipment and techniques to varnished paper, printed sheets, bottle labels, paper envelopes after the application of gum to the flaps, and postal cards is discussed. 7 illustrations. L.E.W.

WILLIAMS, A. E. Infra-red and paper. World's Paper Trade Rev. 135, no. 20: 1453-6 (May 17, 1951); Paper & Print 24, no. 2: 175-6, 179-80 (Summer, 1951).

The author describes the principles of infrared heating by electrical lamps and several applications in the paper industry, including the drying of powdered materials (sizes and fillers), the conditioning of paper with an excessive moisture content, the drying of coated or varnished paper, and the heating of tub-sizing mixtures which are very sensitive to heat and require accurate temperature adjustment. 6 figures. E.S.

HISTORY

TAY, EVA, and ZUBRYN, EMIL. Mexican bark paper. Inland Printer 127, no. 3: 42 (June, 1951).

The arrival of Cortez in Mexico in 1517 was recorded on a specimen of bark paper which has been preserved. Bark paper, called amatl, was made from the inner bark of fig trees, the nettle bush, or mulberry trees. The large sheets which were used for books were treated with heated stones to smooth the surface and were bound with ornamental and jeweled wooden boards. Traces of the native craft of making paper from the inner bark of trees still exist in isolated Mexican villages. 1 illustration. M.W.

H-ION CONCENTRATION

KANTROWITZ, M. S. Acidity control . . . its importance to paper and printing processes. Printing Equip. Engr. 81, no. 9: 113 (June, 1951).

An accurate determination of the pH value of paper is most important in papers which are intended for use in permanent records, and these papers should have a pH of 5.0 or higher. The acidity of inks is controlled by standardizing the acidity of the raw materials. One of the most important applications of pH control in lithography applies to fountain etch solutions where a pH of 3.8 for zinc and 4.6 for aluminum plates is recommended. M.W.

ILLUMINATION

GODLOVE, I. H. Color change from daylight to night light, calculated and observed. J. Optical Soc. Am. 41, no. 6: 396-401 (June, 1951).

From the "pure physics" of illumination, a sky blue in daylight should change to a honey yellow in 60-watt tungsten light. For most colors, the data of Helson and Grove, plotted on a circular Munsell diagram, show that adaptation permits only about half the change calculated and plotted from the "pure physics." Conversion from I.C.I. Illuminants C to A was accomplished with a special filter and the tristimulus integrator. Other colors show lines of change approximately parallel to that for sky blue (except yellows and oranges, which become redder). Such lines indicate large hue changes for some starting hues and large chroma changes for others. On the assumption that all changes are half those of "pure physics," "theoretical" curves are obtained for change of hue and chroma plotted against starting hue. Two points, each of zero change and large plus or minus change, were found for both hue and chroma; large hue changes occur where chroma changes are

small and conversely. Two-check direct observations of color changes in lights close to C and A on each of about 150 dyeings, using eight-step scales, confirmed the maxima and minima and general "theoretical" curve shapes very well. To a first approximation, the changes depend only on the starting (daylight) color and slightly on other factors. A section on the behavior of mixtures is included. 1 table, 8 figures, and 5 references. E.S.

INSECTS AND VERMIN

EVANS, DOROTHY M. The decay of books. The Penrose Annual 45: 139-40 + 2 plates (1951); *cf.* B.I.P.C. 20: 401.

The author discusses the influence of humidity and temperature and the presence of food materials on mold growth and insect infestation of books. No effective repellent is yet known, but some degree of protection is possible. In addition to well-planned storage conditions which allow a free circulation of air, the trend toward the use of synthetic adhesives, nylon thread, and synthetic-coated bookcloths is reducing the potential damage by removing the food materials which attract destructive pests. Four illustrations of books damaged by termites, bookworms, mold growth, and cockroaches are included. E.S.

INSTRUMENTATION

ROSE, S. W. As a meterman sees it. Tappi 34, no. 6: 95-6A (June, 1951).

Regardless of the facilities provided, the biggest problem facing the instrument supervisor is the training of his men. An outline for the training of high-school graduates with good grades in mathematics and high scores in mechanical aptitude tests is given, although the methods cannot be standardized because of the wide range in sizes of mills and available facilities. The trainee should be made to understand that he should become a good meterman and not remain satisfied with being a good helper. E.S.

INTERIOR PACKING

GENERAL MILLS, *Minneapolis.* Vermiculite cushioning. Modern Packaging 24, no. 10: 80-1 (June, 1951).

The General Mills Research Laboratory has developed a method of protecting baked goods during shipment through the use of a cushioning material called vermiculite. Vermiculite is mica puffed by heat into soft pellets. During tests, popcorn and Cheerios were also tried as cushioning materials and each provided equal protection, but vermiculite was selected as best for regular use because it provides the following advantages: shock absorption and resiliency, absorbing quality which prevents leakage through the outer container, resistance to acids and alkalies, fireproofness, ease of handling and light weight, nontoxicity, rodent-, vermin- and rotproofness, insulating properties, freedom from odor, and low cost and availability. 3 illustrations. M.W.

KENAF

DAS, D. B., MITRA, M. K., and WAREHAM, J. F. Composition of Bimlipatam and Mesta fibres (*Hibiscus cannabinus*). J. Textile Inst. 42, no. 4: T181-4 (April, 1951).

Efforts are being made to substitute *H. cannabinus* for jute fibers in Indian jute mills and, with this in view, a comparison of the chemical composition of the fibers with that of white jute is presented. Two varieties of *H. cannabinus* fibers, Bimlipatam and Mesta Pat fibers, were analyzed for their fat, ash, lignin, α-cellulose, xylan, polyuronide, and hexosan contents,

and the results were compared with the amounts of these constituents in white jute (*Corchorus capsularis*). They indicate that if the quality of the fiber is dependent on its chemical composition, it is not the amounts of lignin, fat, or α-cellulose which are responsible for the stiffness of the *H. cannabinus* fibers, but that this quality may be the result of their high polyuronide or xylan content. 2 tables and 12 references. M.W.

LIGNIN

ANDERSON, I. V. Lignin for golf greens and other horticultural uses. Northern Rocky Mountain Forest and Range Exp. Sta. Research Note no. 87: 4 p. (January, 1951).

Experimental use has been made of Douglas-fir lignin (from the wood-saccharification pilot plant at Madison) as a soil conditioner for golf greens. Observations were made for a period of three years, and indications are that it is a satisfactory substitute for peat moss as a conditioning agent. Experiments on the use of lignin for greenhouse work resulted in favorable growth reactions, improvement in the physical condition of the soil, and a reduction of mineral salts in the soil, possibly an indication of better utilization of nutrients. Lignin was tried as a mulch on strawberries, but appears undesirable in that capacity, because it sticks to the fruit. M.W.

RITTER, D. M. Non-degradative oxidation of lignin sulfonates. J. Am. Chem. Soc. 73, no. 6: 2550-3 (June, 1951).

In order to obtain information concerning the nonbenzenoid portion of lignin derivatives, sodium peracetoxy lignosulfonate was oxidized with mercuric acetate, quantitatively and without molecular degradation. The product was a carboxy dihydroxylated lignosulfonate from which methylated and acetylated derivatives and a potassium salt were prepared. The product and its methylated derivatives underwent spontaneous γ-lactone formation. It was concluded that each C_{18} unit of the lignosulfonate ion contains at least four contiguous aliphatic carbon atoms, the terminal one of which bears the hydroxyl group of a primary alcohol. The fourth carbon in the group may bear one of the aromatic rings. 3 tables, 2 figures, and 21 footnotes. E.S.

LIME AND LIMESTONE

MÄKILÄ, EINO. The reburning of lime sludge. Norsk Skogind. 5, no. 4: 118-23 (April, 1951); Paper and Timber (Finland) 33, no. 4a: 133-9 (Special issue, April, 1951). [In Swedish and Finnish; English summaries]

The costs of lime-sludge reburning have recently been lowered by improved kiln constructions and a better heat economy. The author describes the lime recovery plant of Oulu Oy, Finland, with a daily capacity of 90 tons. Directions for the efficient operation of a unit of this type are given; cost data are included. The highest cost item is fuel (56%). It is claimed that the process has many advantages, that a better lime can be obtained than by burning limestone, that a raw material is recovered, and that no transport costs are involved. 3 tables, 4 illustrations, and 12 references. E.S.

MURRAY, J. A., FISCHER, H. C., and SABEAN, D. W. Effect of time and temperature of burning on quicklime properties. Paper Trade J. 132, no. 22: 22-4, 26-9 (June 1, 1951).

Pure calcite, sized to pass a No. 10 sieve and to be retained on a No. 20

sieve, was calcined in an electrically heated rotary tube, which was provided with continuous feed and discharge. Over 40 calcinations were made, at maximum material temperatures varying from 1700 to 2400°F. and for retention times varying from 46 to 474 minutes. The density, porosity, surface area, and reactivity with water were determined on each of the resulting quicklimes. Porosity, surface area, and reactivity with water are closely related. Highly porous limes have a high surface area and a fast rate of reaction, whereas limes of low porosity are characterized by low surface area and slow reaction with water. The results show that porosity of the quicklime is determined primarily by the rate of heating prior to and during calcination, whereas the heating conditions subsequent to calcination have relatively little effect. When material of this size required 35 minutes or more to reach a temperature of 1700°, the resulting quicklime was always highly porous, regardless of subsequent treatment. Quicklimes calcined in increasingly shorter periods were correspondingly less porous. 1 table, 12 figures, and 9 references. E.S.

LOADING AND UNLOADING—CARS

PULLMAN-STANDARD CAR MFG. CO., *Chicago*. Freight car device protects goods, curbs load shifts. Food Eng. 23, no. 6: 115 (June, 1951).

The damage to goods in transit is minimized with the use of a new freight car bulk-heading device called the Compartmentizer which prevents the shifting of loads. It consists of two or more pairs of adjustable steel gates which are locked in place at the ceiling, wall, and floor of the car. The gates provide sealed compartments for partial shipments and may be stored in a small space at the end of the car when not in use. The unit has no loose parts to remove or install and can be easily handled. 1 illustration. M.W.

MACHINERY

ANON. Bone Bros. Ltd. World's Paper Trade Rev. 135, no. 16: 1152, 1157-9 (April 19, 1951).

Reference is made to the engineering firm of Bone Bros. Ltd. at Manor Farm Road, Alperton, in the London area, which entered the field of the paper and board engineering industry in 1943. In addition to general equipment, the firm devotes particular attention to certain specialty products, such as machinery for the manufacture of wallboard, asbestos-cement board, and corrugated sheets, and paper-waxing machines. A general service for maintenance, replacements, and alterations in the paper and board industry has also been developed. 6 illustrations. E.S.

CENTRAL ASSOCIATION OF FINNISH WOOD-WORKING INDUSTRIES. Machinery and equipment for logging. Paper and Timber (Finland) 33, no. 5: 189-93 (May, 1951). [In Finnish; English summary]

Brief descriptions of a number of logging devices are given, including the Swedish motor saw Be-Bo, the Finnish log skidder Veto-Veikko, a wheel tractor equipped with rubber tracks, a boom-coupling lock of Russian origin, a tank for displacement measurement of a log bundle, and motor boats equipped with buffers for feeding timber into flumes or sorting enclosures. 1 table and 8 illustrations. E.S.

DOWNINGTOWN MANUFACTURING COMPANY. "New develop-

ments in paper making equipment." Paper Mill News 74, no. 24: 60, 68 (June 16, 1951).

Brief reference is made to a reel with pneumatic clutch and brake, a two-drum winder with shear-cut slitters located below the winding drums, and right-angle paper machine floor drives. 3 illustrations. E.S.

MACHINERY—CHIPPERS

GRAHAM, PAUL. How to use chippers profitably. Wood 6, no. 5: 17-18; no. 6: 22-3 (May, June, 1951).

Although the establishment of wood-waste utilization processes requires a substantial investment and expensive promotion, any wood industry operation can make valuable use of wood chippers and wood hogs to reduce waste to a form which is most usable as fuel or salable to independent processing plants for other products. Two portable chippers, the Fitchburg chipper manufactured by the Fitchburg Engineering Co., and the Brush Hog made by Mitts and Merrill, are described in the first article. In the second part, the use of stationary equipment, chippers and hogs of the knife and no-knife variety, is explained, and points to consider in the selection of the proper machine are enumerated. 7 illustrations. M.W.

MACHINERY—DRIVE, ELECTRIC

MEUNIER, ROY A., and BORGSTADT, R. D. Morris Paper Mills lower felt costs with new wet-end drive. Paper Mill News 74, no. 24: 71, 73 (June 16, 1951).

Drive changes on two cylinder board machines involved the isolation of the wet-end sections from the lineshaft and the provision with individual motor drives controlled by precision-type, all-electronic speed regulators. The details of the installation are discussed. The new helper drives permit the use of lighter felts and worn felts which normally could not be used. These lighter felts decrease initial felt cost and, with the helper drives, have a longer felt life than the former heavy felts; in addition, a better product is made with them. 3 illustrations. E.S.

MACHINERY—DRYERS

NUKI, R. P. Drying of paper and forced steam circulation. Papeterie 73, no. 4: 187, 189, 191, 193, 195, 197 (April, 1951). [In French] *cf.* B.I.P.C. 14: 55, 206; 16: 551.

The advantages of the steam circulating heating system for paper drying are outlined. 2 figures and 9 references. L.E.W.

WILLIAMS, A. E. The draining and air venting of paper machine drying cylinders. World's Paper Trade Rev. 135, no. 21: 1529-33 (May 24, 1951).

The advantages of the Spirax system for air and condensate removal from drying cylinders are described. Each cylinder is treated as a separate unit, so that one cylinder will not interfere with another as far as discharge of air and condensate is concerned. The system is claimed to reduce start-up time and steam consumption and to increase output and quality of paper. 4 figures. E.S.

MACHINERY—FELTS

DEBOUCHAUD, P. Felts used in papermaking. Bull. assoc. tech. ind. papetière 5, no. 3: 127-42 (April, 1951). [In French]

The manufacture of the different types of woolen and cotton felts, their applications in paper manufacture, maintenance, enemies, etc., are described in detail. In conclusion, brief reference is made to the use of synthetic fibers, nylon in particular. 8 illustrations. L.E.W.

WOODSIDE, L. M. Paper machine felts—their influence on papermaking problems. Tappi 34, no. 6: 115-16A (June, 1951).

To make a felt for any position on the paper machine, there must be balance between strength, openness, and fineness or finish. A felt is designed to operate under a definite set of conditions; when any of these are changed (for instance, when the machine is speeded up), a previously satisfactory felt may give trouble and will continue to do so until a new felt to meet the new conditions has been designed. The feltmaker should know as much about the paper machine as the operator and any changes should be brought to his attention. Reference is also made to the importance of a good felt-maintenance program, including washing, and to the keeping of felt-performance records. The removed felts should be studied, particularly the manner in which they wear out; the records should be brought to the feltmaker's attention who, in many instances, may be able to design improved felts with better life and performance. E.S.

MACHINERY—HOODS

MONTGOMERY, A. E. Hoods and hood exhaust. Paper Mill News 74, no. 24: 52, 54, 56, 106 (June 16, 1951).

Following a brief description of the construction of the first paper-machine hoods and their shortcomings, the author discusses good hood design and proper hood-exhaust volume, the cost of air as a papermaking material, and the need for and the importance of heat recovery from the hood exhaust. The future of paper-machine hoods will probably involve totally enclosed driers with greatly reduced air-exhaust volume and maximum heat recovery, possibly with recirculation of the partially dehumidified exhaust air back to the paper machine. E.S.

MACHINERY—PAPER MACHINES

BELOIT IRON WORKS. Recent Beloit machines. Paper Mill News 74, no. 24: 74, 76 (June 16, 1951).

Some of the outstanding high-production machines are described which the company has built since June, 1950. They include Fourdrinier machines for the Camp Manufacturing Co., a kraft linerboard machine for Finland, a light-weight, air-mail paper machine for Norway, and a Yankee-type, creped toilet-tissue machine for Northern Paper Mills. 3 illustrations. E.S.

THE MOORE & WHITE COMPANY, *Philadelphia.* Moore & White machines in 1951. Paper Mill News 74, no. 24: 58 (June 16, 1951).

New paper machines and major additions to paper machines by the company in mills of the United States are listed. 4 illustrations. E.S.

WYNNE-ROBERTS, R. I. [New Fourdrinier paper machine at Finch, Pruyn and Co.] Tappi 34, no. 6: 52A, 54A (June, 1951); Fibre Containers 36, no. 5: 92 (May, 1951); Pulp & Paper 25, no. 6: 93-4 (June, 1951); Paper Mill News 74, no. 24: 86 (June 16, 1951); Southern Pulp Paper Manuf. 14, no. 7: 50 (July, 1951).

The special features of the new 122-inch Fourdrinier machine built by Pusey & Jones are outlined; it is designed to produce 75 tons of high-grade paper at a maximum speed of 1000 ft./min. and incorporates a sizing and coating press. 1 illustration. E.S.

MACHINERY—PAPER MACHINE—YANKEE TYPE

ANON. Northern Paper Mills starts new Yankee tissue machine. Paper Ind. 33, no. 3: 280-2 (June, 1951); *cf.* B.I.P.C. 21: 705-6.

The Yankee-type, creped toilet-tissue machine recently installed by Northern Paper Mills, Green Bay, Wis. is described. 8 illustrations. E.S.

MACHINERY—REFINERS

MAYNARD, C. R. G. Symposium on beating. 1. Some experiments with conical refiners. World's Paper Trade Rev. 135, no. 17: 1225-30, 1235-40 (April 26, 1951); Paper-Maker (London) 121: 17-20, 22, 24, 26, 30, 32, 34, 58 (Mid-Summer, 1951).

Experimental work with a mill-scale high-speed refiner and jordan is described, which was carried out in connection with the installation of a continuous beating system in a mill. Reference is made to the difficulties of keeping all variables under control in large-scale trials; however, a very large number of tests were repeated to make certain that real differences were observed. Deliberately, no detailed experimental results in the form of tables or graphs are presented; the findings which are given have been deduced from a detailed analysis of many hundreds of curves relating the different qualities and variables. Following a description of the equipment and layout of the experimental plant, the testing procedures on the samples are outlined which involved the following tests: wetness, sheet-drainage time, fiber index, shrinkage on drying, density, air porosity, oil-penetration time, burst factor, breaking length, and percentage stretch. The variables in the high-speed refiner operation included: throughput of pulp, shell setting or power consumption, consistency of pulp, hydraulic pressure inside the refiner, and setting of the recirculation valve; those in the jordan: shell setting or power input, consistency, and hydraulic pressure. The principal findings were almost entirely negative; the deliberate changing of the different experimental variables did not alter either the economic or quality aspect of the beating to a degree beyond that of the normal error spread of the experimental runs, particularly in the high-speed refiner. The operation of the jordan is also relatively unaffected by the alteration of the operating variables, although low power consumption and high operating pressure may somewhat increase its tendency to wet beating. The most significant point is that it was not possible by any normal alteration of the external operating variables of the high-speed refiner or the jordan employed to render them capable of producing the same quality of pulp. It makes little difference to the final quality of the pulp whether it is wet beaten before it is cut or vice versa. 4 tables and 18 figures. E.S.

MACHINERY—ROLLS

ANON. Uniform nip pressure on paper mill rolls assures sheet of better quality. Chem. Processing 14, no. 6: 18-19 (June, 1951).

Reference is made to a load meter which the United States Gypsum Co. installed on one of its large combination felt and linerboard machines for obtaining uniform nip pressures; the meter makes use of standard load cells based on SR-4 bonded resistance wire strain gages which permit the direct measurement of roll loads and eliminate the effects of friction and eccentric loading. 1 illustration. E.S.

CATFORD, D. R. The operation of anti-deflection top press rolls on newsprint machines. Pulp Paper Mag. Can. 52, no. 3: 221-5 (Convention, 1951); Paper Mill News 74, no. 24: 98, 100, 102, 104, 113 (June 16, 1951).

In the literature, references (notably those of Garrett, *cf.* B.I.P.C. 16: 397) have been made to the inadequate pressing ability of the present top press rolls. The antideflection roll (I) appears to be the answer to some of these inadequacies of pressing in granite rolls. The reverse deflection of granite rolls has been established in practice from moisture distribution and actual deflection tests. In (I) the roll face is supported on a central shaft fastened at the center two feet in the case of Stonite rolls, and three feet for granite. Any load applied at the journals has the effect of loading the top roll like a point-loaded beam; hence, deflection downward only can be obtained. From the over-all results obtained with (I), more uniform pressing, lower steam consumption, lower drier pressure, and lower moisture of the sheet leaving the press have been observed; in addition, fewer dry cuts, easier starting with new felts, and better machine operation have been the trend. Operating data from three newsprint machines at Three Rivers, Que., Canada, with and without deflection rolls are given. Reference is made to severe pickup of pitch deposits by Stonite rolls when hard water is used in the system; the complete answer to this problem is found in the granite (I), because it appears that there is no material so well adapted to shed pitch as granite. A material with better mechanical and pressing properties than granite would be a great advance in the utilization of the antideflection principle. 1 table, 7 figures, and 2 references. E.S.

DOWNINGTOWN MANUFACTURING COMPANY. Downingtown load meter, recording, and controlling. Paper Mill News 74, no. 24: 63-4, 66, 68 (June 16, 1951); *cf.* B.I.P.C. 20: 250.

The Downingtown direct roll load indicating, recording, and controlling device with SR-4 bonded wire strain gage and its operation are described. It can be applied to presses, calenders, beaters, or any other point of a machine where it is desired to measure and control a load. 3 figures. E.S.

LUTZ, ALFRED C. How to get most service from rubber-covered rolls. Paper Trade J. 132, no. 24: 56-7 (June 15, 1951).

Some suggestions to follow in the care of rubber-covered couch and press rolls are presented. 2 illustrations. M.W.

MACHINERY—SCRUBBERS

EKMAN, FRANK O., and JOHNSTONE, H. F. Collection of aerosols in a Venturi scrubber. Ind. Eng. Chem. 43, no. 6: 1358-63 (June, 1951).

The object of this work was to determine the variables affecting the efficiency of the venturi scrubber for collecting aerosols. Oil aerosols of three different drop sizes were used in a laboratory unit constructed of Plexiglas, and water was introduced into the throat in three different ways. The collection efficiency of the scrubber depended on the operating conditions and the nature of the aerosol. A method of correlating the efficiency with the pressure loss is proposed. This method is useful for extrapolating the performance of pilot-plant and industrial installations to determine the optimum design and operating conditions. 3 tables, 8 figures, and 12 references. E.S.

MACHINERY—SLITTERS AND WINDERS

SCHAAN, J. A new type of automatic rewinder of Norwegian manufacture. Bull. assoc. tech. ind. papetière 5, no. 3: 143-5 (April, 1951). [In French]

A brief description of the Roen automatic rewinder is given, which rewinds paper of 40 to 120 g./m. basis weight from one or two parent rolls into several jumbo rolls; it is operated by electrical and pneumatic means. 4 illustrations. L.E.W.

MACHINERY—SUCTION ROLLS

GLAUNER, EMERSON N. Suction rolls on tissue machines. Paper Mill News 74, no. 24: 90, 92, 106 (June 16, 1951); *cf.* B.I.P.C. 20:251.

Essentially the same information is presented as in the previous article. 4 illustrations. E.S.

MACHINERY—VALVES

WHEELER, G. E. The air actuated diaphragm control valve. Can. Pulp Paper Ind. 4, no. 6: 142, 144-6 (June, 1951).

The author discusses the problems which arise in sizing, installing, and maintaining automatic, air-actuated diaphragm control valves and the important points to be considered in their selection. 1 table. E.S.

MATERIALS HANDLING

ANON. How Massachusetts mill solved a materials handling problem. Paper Ind. 33, no. 3: 296 (June, 1951).

Reference is made to the transport of cooked pulp in the West Groton mill of the Hollingsworth & Vose Co. from the rotary boilers to the beaters about 200 to 400 ft. distant in mechanical fork trucks equipped with revolving head attachments which provide a fast means of dumping the pulp into the beaters. The difference in level between boiler and beater room floors was overcome by the construction of a 12% ramp which connects both floors and over which the trucks can travel. 2 illustrations. E.S.

CANADIAN PULP AND PAPER ASSOCIATION. *Technical Section. Materials Handling Committee.* New method of railroad-car shunting. Pulp Paper Mag. Can. 52, no. 6: 102, 104 (May, 1951).

Brief reference is made to the Trackmobile, made by Whiting Corporation, Harvey, Ill., a new low-cost car shunter, which employs a set of four standard-contour car wheels for track travel and rubber wheels for ground travel; the latter are retracted during track operation. It can change from track to ground operation in 30 seconds and can transfer from one track to another without running to a switch. 2 illustrations. E.S.

JENKINS, PHILIP. RollAskid paper turner. Printing Equip. Engr. 81, no. 9: 55 (1951).

A description is given of a device, called the RollAskid paper turner, which permits one operator to turn over a skid of sheets which are printed on one side preparatory to backing up the other side on the press. A standard-type hoist affixed to the ceiling furnishes the lifting power, and the pile is turned by the operator while it is held suspended above the floor. 1 illustration. M.W.

REDLON, CLARENCE C. Handling raw materials of paper manufacture, yard handling of baled wastepaper for paperboard manufacturers. Fibre Containers 36, no. 6: 87-90 (June, 1951).

The author describes the unloading and warehousing facilities of the American Box Board Co. at Grand Rapids, Mich., the delivery of the baled paper by fork trucks to the various beaters, and the disposal of waste by Dempster Dumpsters to an abandoned quarry nearby. Maintenance of pulp mill handling equipment and fire prevention and control also receive consideration. E.S.

THORNTON, RALPH. Materials handling system. Printing Equip. Engr. 81, no. 9: 84, 105 (June, 1951).

The system of handling newsprint rolls from the unloading dock to the plant of the Minneapolis *Star* and *Tribune* is described. The use of mechanized equipment eliminates the possibility of damage and permits speedier handling and greater efficiency. 2 illustrations. M.W.

MATERIALS OF CONSTRUCTION

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY. Specification for chromium-nickel-iron alloy castings for sulphite pulp processing equipment. Tappi 34, no. 6: 117-18A (June, 1951).

This is a revision of TAPPI Official Standard E 400 s-43. 2 tables. E.S.

METERS AND RECORDERS

PAGET, J. A. Pneumatic transmission. Can. Pulp Paper Ind. 4, no. 6: 122, 124, 126, 128 (June, 1951).

A pneumatic transmission involves a system of transmitting the reading of a measurement in one location to a reading in another by means of air in a pipe line. It consists of two units, transmitter and receiver elements, which may be separated by as much as 1000 feet. Different types of transmitters and receivers and some of their applications are discussed, with particular reference to developments by Foxboro. 4 figures. E.S.

MILL MANAGEMENT

ANON. Absenteeism in the paper industry. Paper Making and Paper Selling 70, no. 1: 11-12 (Spring, 1951).

In various industries, including the pulp and paper industry, it has been shown that between eight and 15 days are lost from work because of ordinary illness and injury for each day lost because of illness or injury of occupational origin. Statistics also indicate that absenteeism is greatest on Mondays and the day following a holiday. A program for reducing absenteeism by improving employer-employee relations is described. This included regular physical examinations for employees, accident-prevention campaigns, vacations, rest periods, most desirable working arrangements, and maximum use of existing transportation facilities. A good worker-foreman relationship is also important in minimizing absenteeism. M.W.

NATIONAL PRODUCTION AUTHORITY (NPA)

OSEAS, ISRAEL B. Industry advisory committees to government agencies. Paper Trade J. 132, no. 22: 18, 21, 32-3 (June 1, 1951).

The formal mechanism for contact between business and government

provided by the Defense Production Act of 1950 is the advisory committee. The rules published by the Office of Price Stabilization and by the National Production Authority which deal with advisory committees are outlined and discussed. The shortcomings of these rules are pointed out, and some suggestions for the revision of the rules are presented. M.W.

NEW ZEALAND FLAX

CRITCHFIELD, HOWARD J. Phormium tenax—New Zealand's native hard fiber. Econ. Botany 5, no. 2: 172-84 (April-June, 1951).

The cultivation, processing, and uses of *Phormium tenax* (New Zealand flax), the native hard fiber of New Zealand, are described. The plant is wholly utilized domestically for woolpacks, matting, twine, and, in smaller quantities, in paper manufacture. 12 figures and 6 references. M.W.

NEWSPRINT

BOWATER, ERIC. Economics of newsprint production. World's Paper Trade Rev. 135, no. 23: 1652, 1654 (June 7, 1951).

As reasons for the present shortage of newsprint, the stupendous growth in the circulation of the press and the lack of construction of new mills or additional capacity during the "Dirty Thirties" are listed. The postwar expansion in the Canadian newsprint industry was largely brought about by the speeding up of equipment in the industry. The only lasting solution lies in the construction of new newsprint mills throughout the world. However, the cost of such an undertaking is so enormous that, unless production at an economic price over a reasonable period is assured, nobody is willing to take the risk. E.S.

OAK

ANON. Scrub oak pulp. Chem. Week 68, no. 22: 17 (June 16, 1951).

A process developed at the University of Florida eliminates the difficulty of debarking scrub oak. The logs are chipped without debarking, and the components are then separated by passing the mixture over an air flotation table where the difference in gravity and particle size separates the bark and wood chips. The Georgia State Legislature is considering a recommendation to appropriate funds for a joint program with the University of Florida to develop the process for producing a filler pulp for high-grade paper. 1 illustration. M.W.

PACKAGING

ANON. Geographical considerations. Modern Packaging 24, no. 10: 73-7, 190 (June, 1951).

The importance of studying the geographical considerations in packaging is pointed out. Not only climate, soil characteristics, and water supply, but also local economic conditions, trade practices, dietary, social and racial customs, and legislation may have important bearing on marketing and packaging. Some examples of the various packaging practices for different parts of the country are cited. 9 illustrations. M.W.

ANON. Sealed packages in plastics sheeting. Brit. Plastics 24, no. 264: 144-5 (May, 1951).

A new manufacturing technique which employs a new method of filling and radio-frequency welding has made possible the development of complicated and intricate packs from plastics sheeting. Solids, liquids, powders,

creams, and pastes can be packed together or separately in various ways. The technique may also be applied to polyvinyl chloride-coated paper. 7 figures. M.W.

BILOW, M. C. Packaging essential in war contracts. Am. Paper Merchant 48, no. 6: 26 (June, 1951); Am. Paper Converter 25, no. 7: 9 (July, 1951).

The cost of packaging to meet Army requirements is considered to be an average of 10% of the original contract price, so it is essential for manufacturers to be acquainted with, and to understand, packaging specifications when bidding on and filling war contracts. The supplier of packaging materials has the responsibility of explaining and demonstrating the use and applications of the packaging and preservative materials to the manufacturer of the goods; the latter will be rejected until properly packaged according to the required specifications. M.W.

FULHAM BROS., INC., *Boston.* Seafood a la color. Modern Packaging 24, no. 10: 102-4 (June, 1951).

Two new package features, extra flavor protection with a new "taste-seal" wrapper and color coding for easy selection, have been adopted for the packaging of "4 Fishermen" brand frozen fish. A waxed board, no-glue, tuck-flap construction, closed-in carton is used. The wrapper is a high-strength, 32-lb. bleached kraft with a coating of special formulation (reputedly polyethylene) which is distinguished by its gloss, no ruboff, exceptionally strong welded heat seal, very low water-vapor permeability, and unusual flexibility, strength, and stability at low temperature. The hard finish of the coating provides an excellent base for full-color rotogravure printing. The wrappers are printed in six colors, with a different color scheme for each product but a similar format to provide for easy identification. This packaging method provides maximum protection to the product and customer appeal and satisfaction. 5 illustrations. M.W.

O'REILLY, R. A., JR. General Motors packaging operations. Fibre Containers 36, no. 6: 56, 58, 60 (June, 1951).

The distribution of parts in General Motors consists of two phases: the accumulation at one point of parts from various plants so that cars and trucks can be assembled, and the distribution of replacement parts to dealers throughout the country. The packaging of replacement parts requires particular consideration because of the time-lapse involved between packaging and use. To illustrate the necessary protective measures, the packaging procedure used for Hyatt wheel bearings is described. These bearings are packaged individually in kraft-glassine laminated cartons which provide corrosion protection and easy identification at minimum cost. M.W.

PAPER—COATED

DAY, FREDERICK T. Paper conversion and usage. No. 9 (Parts 1 and 2). An outline of the manufacture of coated papers and boards. World's Paper Trade Rev. 135, no. 17: 1204, 1206; no. 19: 1382, 1387 (April 26, May 10, 1951).

The author discusses the manufacture and uses of clay-coated papers, including off- and on-the-machine coating operations. Such papers find wide applications in the printing, boxmaking, and converting trades. E.S.

PLATZER, NORBERT. Polyvinyl acetal resins. Modern Plastics 28, no. 10: 142, 144, 146, 148 (June, 1951); *cf.* B.I.P.C. 21: 578.

Processes for the preparation of polyvinyl acetal resins are described; the chemical constitution and physical properties of the resulting products are discussed. In addition to other applications, the materials find use as coatings for paper and textiles. 2 tables, 5 figures, and 9 references. M.W.

POWELL, G. M., QUARLES, R. W., SPESSARD, C. I., MCKNIGHT, W. H., and MULLEN, T. E. Formulation studies of vinyl resin organosols. Modern Plastics 28, no. 10: 129-30, 132, 134, 136, 138, 140, 198 (June, 1951); *cf.* B.I.P.C. 16: 504.

Following a review of the development of dispersion techniques, a description of the formulation of organosols and studies of various dispersant-diluent combinations for vinyl resins is presented, with particular emphasis on the factors which influence the resulting products. The higher-molecular-weight resins have found widespread applications as tough, flexible coatings for paper and cloth and for the manufacture of unsupported film. 18 figures and 16 references. M.W.

YODER, P. H. Protective and decorative coatings applied from organic solvents. Tappi 34, no. 6: 84-7A (June, 1951).

A brief description is given of the materials used for solvent coating, and the different methods of application to sheets and continuous webs are outlined. Reference to the present supply situation is made. E.S.

PAPER—CONVERSION

DAY, FREDERICK T. Paper conversion and usage. No. 3. Paper treatment after printing. World's Paper Trade Rev. 135, no. 1: 42-3 (Jan. 4, 1951).

The author discusses some of the recently developed attractive paper treatments for functional or decorative purposes, including cellulose varnishing, sheet varnishing of paper by machine, strip varnishing, water varnishing, varnishing plus graining, and embossing. 1 illustration. E.S.

PAPER—FILLERS

KOCH, HAROLD C., BRANDON, C. E., and GEOHEGAN, K. P. The microscopic identification of paper fillers. Tappi 34, no. 6: 265-9 (June, 1951).

The identification of the more common paper fillers with the aid of a microscope is discussed. The methods of chemical microscopy applied are recommended as being fast, convenient, and dependable. Procedures are given for the recognition of diatomaceous earth, talc, clay, and the ions of calcium, zinc, barium, and titanium. 14 photomicrographs and 4 references. E.S.

PAPER—MERCHANDISING

ANON. Leonard Paper Company. Am. Paper Merchant 48, no. 6: 12-13, 36-7 (June, 1951).

To illustrate the successful operation of a relatively small paper merchandising concern, the business practices of the Leonard Paper Co., Baltimore, are described. The company's business is roughly divided into 75% warehouse and 25% direct shipments, with a complete inventory turnover about eight times per year. It has five general salesmen and one specialist who serves only the bakery field. The chief factor in the sales policy is service to customers in handling general, small, and rush orders. Other factors which

contribute to the success of the company are its operation of paper departments in retail stores, its close work with the source of supply, its maintenance of one price to all, its cash-and-carry retail store, sales meetings supplemented by follow-up letters, and a close scrutiny of trade publications. 3 illustrations. M.W.

CANFIELD, CHARLES. Mill and merchant relationship. Paper Trade J. 132, no. 24: 54-5 (June 15, 1951).

The tremendous increase in production and use of paper since the first World War has been accompanied by a complete change in the relationship between merchants and paper mills. Prior to this time prices were not standard, and the merchant sold his own brand. Technical knowledge was scarce and jealously guarded. Today with standard prices, qualities, and grades, and the realization that technical knowledge should be available to the industry as a whole, co-operation between the merchant and the mill is a necessity. The merchant must know and interpret consumers' specifications to the mills, and the major selling point today is no longer cost but reliability of product, information, and source of supply. Only by working with producers and consumers to solve mutual problems can the paper merchant increase his sales. M.W.

MORRIS, CHARLES V. Apply benefits of equivalent weight factor —it pays off. Paper & Paper Products 92, no. 17: 1, 10-11 (May 20, 1951).

Examples are given to show how the knowledge of similar characteristics and almost identical weight of different types of paper may help printers in an emergency when the desired stock is not available for rush orders; the same principles may also be applied for cutting production costs under certain conditions. 1 table. E.S.

PAPER AND PULP INDUSTRY

NATIONAL PAPER TRADE ASSOCIATION. Sixteen years of paper distribution. Am. Paper Merchant 48, no. 6: 14-15 (June, 1951).

Two charts are presented which show the relationship of sales, tonnage, gross income, expenses, and profits after federal corporate income taxes for both fine paper and wrapping paper distributors for the period 1940-1950, with the years 1936-1939 used as the base period. In the distribution of fine papers, with the base period considered as unity, the following ratios of increase are shown for 1950: sales—3.09, tonnage—1.74, gross income—2.64, expenses—2.32, and profits—3.25. Similar factors for the distribution of wrapping papers are: sales—3.71, gross income—4.15, tonnage—1.80, expenses—3.70, and profits—6.27. The sizeable increase in sales is apparently the result of a higher selling price rather than a corresponding increase in the volume of sales. 1 table and 2 charts. M.W.

SMITH, STANLEY F. Paper and board supplies in times of shortage. World's Paper Trade Rev. 135, no. 22: 1580, 1582, 1584, 1587-8, 1590, 1592 (May 31, 1951); Paper & Print 24, no. 2: 213-17 (Summer, 1951).

Stressing the fact that the present paper and board shortage has arisen from a demand much exceeding the supply and not from any reduction of supply, the author discusses the outlook in the British pulp and paper industry during the next 12 months with regard to production capacity and raw material supplies (pulpwood, wood pulp, waste paper, sulfur, coal, and

minor nonfibrous constituents). There is no easy and quick solution to Europe's papermaking raw materials problem, although there need be no fear of failure in finding additional resources. The annual world crop of natural cellulose is inconceivably large, and most of it is still unexploited. However, the cost from these sources will almost certainly exceed that from northern conifers. Much technical and scientific investigation will be needed, as well as new pulp and paper mills; all this is bound to take years. A better sharing of world pulp and paper resources between the American continent and the rest of the world seems unlikely to present a lasting solution of the problem. The European nations should work out solutions of their own. 1 table. E.S.

PAPER AND PULP INDUSTRY—EDUCATION

ESTEVAN. Training for productivity. Paper Box Bag Maker: 240-3 (May, 1951).

The author presents a plan for training new employees in paper box factories. M.W.

LIBBY, C. E. Education at New York State College. Fibre Containers 36, no. 6: 120, 122-3 (June, 1951).

A brief outline of the papermaking curriculum at New York State College of Forestry is given; mention of the research program is also made. E.S.

PAPER AND PULP INDUSTRY—EXHIBITS

ANON. Hand-made paper exhibit at 1951 Festival. World's Paper Trade Rev. 135, no. 18: 1307-8 (May 3, 1951); Paper-Maker (London) 121, no. 5: 334 (May, 1951).

In the Arts and Crafts exhibition of the Festival of Britain papermaking by hand will be demonstrated. Bertrams Limited, Sciennes, Edinburgh made the requisite machinery, and three men from Portals Ltd., Laverstoke, will demonstrate the procedures. Since the exhibition will be open from 10 a.m. to 10 p.m. each day, two teams (vatman, coucher, and layer) will be required. Relays will be sent from the mill to carry through the demonstration during the run of the exhibition. The mill is also supplying the required pulp. The paper will bear the crest of the Festival as a watermark. 1 illustration. E.S.

ANON. Walmsleys interesting B.I.F. exhibits. World's Paper Trade Rev. 135, no. 17: 1248, 1250 (April 26, 1951).

Reference is made to true scale models of a 190-inch wire width M.G. machine and a modern supercalender, which were on exhibit at the 1951 British Industries Fair in Birmingham. The M.G. paper machine is a replica of a machine built by Walmsleys (Bury) Limited for Aylesford Paper Mills, Kent, of Albert E. Reed & Co. Ltd.; the scale of the models is one inch to one foot. Every detail of the originals is faithfully reproduced in the models. 2 illustrations. E.S.

GILLIS, S. J. Echoes of the past. The 1851 Exhibition of paper and print. World's Paper Trade Rev. 135, no. 18: 1305-6 (May 3, 1951).

Reference is made to the Gilbart prize essay (1854) by Granville Sharp, in which a detailed and interesting record of certain aspects of the paper

and print section of the 1851 exhibition may be found. One of the most interesting features of the essay lies in the fact that nearly every invention or exhibit referred to is illustrated by the insertion of a specimen or a prospectus describing it. The first 30 samples deal with paper and print and include many specimens of banknote, draft, and check printing on paper specially made for the prevention or detection of forgery. E.S.

PAPER AND PULP INDUSTRY—PUBLIC RELATIONS

BODINE, L. Public relations—why, how. Pulp Paper Mag. Can. 52, no. 6: 105-7, 111 (May, 1951).

The importance of a good public-relations job in the achievement of a healthy business climate within the framework of which industry can profitably operate is emphasized. Before launching a public-relations program, a company should itemize the things the company stands for and the various policies and practices it wants to publicize. Then the areas of misunderstanding and their nature should be determined. The final point to consider is the means through which the public is to be reached. The role of employees in this process is most important, and a special effort should be made to inform and educate them concerning company policies. M.W.

PAPER AND PULP MILLS

ANON. Bridgend Paper Mills, a new Wiggins Teape tissue enterprise. World's Paper Trade Rev. 135, no. 19: 1362, 1364, 1366 (May 10, 1951); Paper-Maker (London) 121, no. 5: 324-6 (May, 1951).

A brief description of the new tissue mill at Llangynwyd, near Bridgend, Glamorgan, South Wales, is given. Construction was started in 1946, and the first of the three paper machines (Jack, Jill, and Baby) started operations in October, 1950; the machines were built by Bentley & Jackson. Power and steam are obtained from a nearby station; special attention has been paid to the water filtration plant with anthracite washing facilities. The stock-preparation plant includes Hydrapulpers, Morden Stock-makers, jordans, and Dirtecs. The production of tissues comprises bleached and unbleached tissues, napkins, and creping, waxing-base, and handkerchief tissues; no rag tissues are made. 2 illustrations in the first reference. E.S.

ANON. Coosa River mill completes first year of operations. Crane Valve World 48, no. 2: 50-3 (1951).

A very brief description of the processes employed at the newsprint and bleached sulfate mills at Coosa River is given. 7 illustrations depicting Crane valves and piping. E.S.

ANON. A threefold anniversary. Svensk Papperstidn. 54, no. 10: 355-60 (May 31, 1951). [In Swedish]

With reference to the 50th anniversary of Örebro Pappersbruks A/B (groundwood mill, two paper machines, one board machine, and a modern bag factory), the 60th anniversary of Frövifors Bruks A/B (a new sulfate mill and four kraft paper machines), and the 65th birthday of their managing director, Gunnar Björkman, a brief history is presented, with emphasis on the important part which Björkman played in the development and modernization of both mills. 9 illustrations. E.S.

PAPER INDUSTRY. Highlights of Camp's expansion program. Paper Ind. 33, no. 3: 285, 294 (June, 1951); *cf.* B.I.P.C. 21: 412.

Brief reference is made to the new paper machine and other innovations at the Franklin mill of the Camp Manufacturing Co. in Virginia. 4 illustrations. E.S.

WEST VIRGINIA PULP AND PAPER COMPANY. New pulpwood handling, semichemical pulp mill, and washing system operating in Virginia. Southern Pulp Paper Manuf. 14, no. 6: 54, 56, 68 (June, 1951); Tappi 34, no. 6: 54A, 56A (June, 1951); Paper Ind. 33, no. 3: 292-4 (June, 1951).

Alterations and additions to the Covington plant of the company are described, including a new hardwood yard, a flume and other wood-handling equipment, a new barkwood drum and pulpwood conveyor, a new semichemical unit, new rotary vacuum washers, and two Sutherland refiners. 6 illustrations in the last reference. E.S.

PAPER FINISH

DAY, FREDERICK T. Paper conversion and usage. No. 2. (Parts 1 and 2). Paper finishes and paper surfaces. World's Paper Trade Rev. 134, no. 20: 1396, 1398, 1400; no. 22: 1576-7 (Dec. 7, 21, 1950).

The author describes the different types of paper surfaces and finishes, including those which are the function of the papermaker and are obtained on the paper machine and those finishes which are applied to paper in either sheet or web form by the paper converter. The importance of these characteristics to the final appearance of the printed or converted product is stressed. 7 illustrations. E.S.

PAPER SIZING

MILTON ROY COMPANY, *Philadelphia.* Continuous emulsion preparation based on controlling ratio of 3 liquid streams. Chem. Processing 14, no. 6: 11 (June, 1951).

The principal requirement in the continuous emulsion preparation of rosin size is the close control of the ratio of the hot rosin to hot and cold water. The hookup of a three-cylinder gang pump for this purpose and its mode of operation are described. 1 flowsheet. E.S.

PAPER SPECIALTIES

ANON. How tapes serve industry. Mill & Factory 48, no. 6: 131-4 (June, 1951).

Various kinds of tapes, tape backings, general industrial applications of tape, and applications of electrical types for insulating, holding, and protecting are enumerated, and some specific industrial uses of tapes are shown in a series of 19 illustrations. M.W.

ANON. Vapor corrosion control. Chem. Week 68, no. 24: 24 (June 30, 1951).

A government specification (MIL-P-3420) for packaging materials treated with a volatile corrosion inhibitor (VCI) indicates that the military services may soon replace grease-type rust inhibitors with chemically impregnated paper. The inhibitor permeates the package and renders moisture noncorrosive. The chief limitation in this type of packaging is the fact that

most inhibitors are water soluble and can be leached out by rain. However, the VCI wraps can be coated with wax to increase their utility. Mention is made of the various companies which produce VCI papers and the chemical nature of the inhibitors employed. 1 illustration. M.W.

AREND, A. G. Production of powder leaves. Paper Making and Paper Selling 70, no. 1: 6-8 (Spring, 1951).

A description is given of the process used in the manufacture of powder leaves, which are tissue paper squares coated with face powder. They are made up in book form, and usually one absorbent sheet contains the fragrance which is imparted to the other sheets. The paper for powder leaves requires special properties of absorbency, vapor porosity, and air permeability. Some tests for these properties are described. The selected paper is coated with a water solution of powder, dried, and cut into squares. The fragrance-containing sheet is sprayed with perfume, cut into squares, inserted within the other squares, and the package is immediately sealed. 2 illustrations. M.W.

DAVIES, C. N. Filter paper for dust control in coal mines. Paper-Maker (London) 121, no. 5: 356, 358 (May, 1951).

For the measurement of dust in air, use is now being made of dust stains which are formed by drawing a known volume of air through filter paper. The light-absorbing power of the stain is measured photoelectrically. Certain desirable qualities in the paper which is used to collect the dust have been established. Photomicrographs show that the most uniform light-screening stains occur on papers which are porous and have homogeneously dispersed, loosely packed fibers. Lack of homogeneity in the paper causes the dust to gather in clumps with open spaces through which light is transmitted. Freedom from opaque blemishes is another necessary characteristic. In tests with various filter papers an esparto paper of low weight gave the best performance. The qualifications are based on filtering performance in testing machines, not for air in bulk. 3 figures. M.W.

DAY, FREDERICK T. Paper conversion and usage. No. 5. The manufacture and uses of waterproof wrapping. World's Paper Trade Rev. 135, no. 5: 288, 290, 292 (Feb. 1, 1951).

The author discusses some of the many recent developments in waterproof wrappings, including laminated, reinforced, creped, impregnated, and lined papers. Consideration is also given to sealing developments, a packing medium known as Sisalkraft and Sisalation, wet-strength kraft, and applications of such papers for road construction, protective covers in warehouses and on farms, roofing and tiling work in the building trades, and gummed tapes. 3 illustrations. E.S.

DAY, FREDERICK T. Paper conversion and usage. No. 8. (Parts 1-3). The manufacture of gummed paper. World's Paper Trade Rev. 135, no. 11: 766-8, 773; no. 13: 895-6, 898; no. 15: 1078, 1083-4 (March 15, 29, April 12, 1951); *cf.* B.I.P.C. 21: 637.

In the first part of the article, the author discusses the body paper and various adhesives employed in the manufacture of the finished product; the two other sections deal with the different uses of gummed papers and the manufacture of some specialties. 7 illustrations. E.S.

HARRINGTON, W. A. Packaging in metallic foil. Brit. Packer 13, no. 5: 31-3, 35 (May, 1951).

Coated and laminated flexible packing materials which utilize aluminum and tin foil are discussed with regard to their use for wrapping and for packing. No definite thickness or specification of metallic foil can be given as suitable for a wrapping because of the many variables involved, but a minimum thickness of 0.009 mm. for aluminum is suggested. It is pointed out that pinholes in foil are of small importance when it is used as a wrapping material. Packing is defined as the making of a sealed package in which a definite degree of protection is provided. For this purpose foils must be coated with a thermoplastic coating or laminated to a film which will heat seal. The use and method of making a foil and cellulose acetate combination is described, and mention is made of flexible packing in a vacuum or in controlled atmospheres such as nitrogen or carbon dioxide. M.W.

HASZARD, F. P. Raw stock requirements for bag paper grades. Can. Pulp Paper Ind. 4, no. 6: 130, 132 (June, 1951).

The author outlines some of the problems of the paper converter resulting from defective rolls supplied by the paper manufacturer. Consideration is given to the need of uniform, evenly wound rolls without slack edges or soft spots, of specified diameter and without damage caused by dropping or bad handling, even basis weight, and good splices. In addition, the paper must be free from defects, such as holes and slugs, possess good printability (be consistent in finish and shade), and be pliable and of specified strength. E.S.

LAL, CHAMAN. A paper maker's village in Japan. Indian Pulp and Paper 5, no. 9: 389-90 (March, 1951).

The handmade paper industry in Japan is expanding as a result of a revived interest in the product by merchants of other countries. Although a number of labor-saving techniques, such as chemical bleaching, have been introduced into the process, it still remains a hand craft; an outline of the various procedures is given. A family of five produces about 800 sheets, 2 by 3 feet in size, per day although, since drying is done outside, the climate is the real regulator of production. The raw materials for handmade paper are kozo, mitsumata, and gampi, and they are utilized to produce over 300 different paper articles. M.W.

LEONARD, GUY. Secrets of "nursing" paper into life. Indian Pulp and Paper 5, no. 9: 392 (March, 1951).

A brief outline of the traditional manufacture of paper by hand by vatman, coucher, and layer is given. E.S.

LINGLE, MERVIN. Increase your sales with fluorescent papers. Graphic Arts Monthly 23, no. 6: 13-14, 16 (June, 1951).

Fluorescent papers are coated with a substance that glows in the presence of daylight, artificial light, or ultraviolet "black" light. Because of the unusual effects which can be achieved through their use, and because they have a definite optical impact, they offer a decided sales advantage. They are no more difficult to handle than any 80-lb. coated stock and do not curl or change in dimensions any more than other papers of similar weight. The coated surface takes ink well, even from fine-screen halftones, but a relatively thick, opaque ink is most successful. Drying time is normal, and both sides of the paper may be printed. Make-ready and press operation are similar to those with any heavy coated paper. From both a sales and shop point of view, the experience of printers with fluorescent papers and boards has been favorable. M.W.

PEEDE, LORING G. 40-year specialization wins fame for H. P. Andrews in blueprint field. Paper & Paper Products 92, no. 19: 1, 6-7 (June 20, 1951).

The author describes the activities of the H. P. Andrews Paper Co. of New York, which supplies blueprint, brownprint, and diazotype-sensitizing firms with base papers for coating. Reference is made to the company's research and technical service and the development of special coating chemicals, including Mertone precoating (a water solution of colloidal silica) for improving blueprint papers; Mertone was developed in collaboration with Monsanto and is licensed and sold to the trade through them. 1 illustration. E.S.

PATENTS

MAKARA, FRANK. Champion wins KromKote suit. Paper Trade J. 132, no. 24: 42 (June 15, 1951).

The litigation which was involved in the patent claims on the "cast-coating" process for paper is summarized. The dispute was concerned with whether or not an invention of a process for applying oil to the coating drum to facilitate removal of the paper could be protected if a definite amount of oil was not specified. The appellate court of the District of Columbia gave a judgment which authorized the Commissioner of Patents to grant to the inventor claims in which no numerically specific amount of oil to be used in the coating composition was stated. This was a reversal of the decision of a Federal district court. M.W.

PARKER, LEO T. Do you know what is patentable? Paper Ind. 33, no. 3: 282-4 (June, 1951).

Examples of case histories are given to illustrate the established law as to what is and what is not patentable. E.S.

PHYSICAL TESTING—FASTNESS TO LIGHT

BOULTON, J., and GUTHRIE, J. C. The design of fading lamps. J. Soc. Dyers Colourists 67, no. 5: 190-2 (May, 1951).

Suggestions for the improvement of present-day fading lamps are presented. The temperature and humidity controls should be capable of providing a variety of conditions with as wide limits as possible and with provision for wet fading. Possible tolerances would be ±2°F. (air) and ±4% R.H. Temperature and relative humidity controls, as well as the samples, preferably should be stationary on the circumference of a circle with the light source rotating about its axis at the center. The carbon arc (2000 kw.) is probably the best light source available at present, although consideration should be given to the possible use of the gas arc or tungsten-filament lamps. The use of a light integrator for recording light energy incident on the samples, which may be attached to any fading lamp, is strongly recommended. 21 references. M.W.

THE SOCIETY OF DYERS AND COLOURISTS. *Fastness Tests Coordinating Committee.* Development of the Society's light fastness standards (B.S. 1006). J. Soc. Dyers Colourists 67, no. 5: 188-90 (May, 1951); Am. Dyestuff Reptr. 40, no. 12: P381-2 (June 11, 1951).

The history of the development of light fastness standards in Great Brit-

ain and the attempts of the Society and the Deutsche Echtheitskommission to establish standards co-operatively is traced. 2 tables and 14 references. M.W.

PHYSICAL TESTING—PAPER—BURSTING STRENGTH

H. E. MESSMER, LTD., *London.* Heavy bursting strength tester. World's Paper Trade Rev. 135, no. 16: 1160, 1162 (April 19, 1951).

Reference is made to a new and improved heavy-type bursting-strength tester, known as HT/1552 Hand Drive, which is built on the lines of the well-known Mullen tester. The gages, 6 inches in diameter, are available for 200, 300, 500, 800, and 1000 p.s.i.; all dials are graduated with equivalent readings in kg./sq. cm. 1 illustration. E.S.

PHYSICAL TESTING—PAPER—PRINTABILITY

THOMSON, A. G. Paper testing and research in Great Britain. Pulp Paper Mag. Can. 52, no. 6: 108-9 (May, 1951).

PATRA methods for the measurement of expansion, opacity, color, ink drying, oil penetration, absorption drying, oxidation drying, and ink tack are discussed briefly. M.W.

PHYSICAL TESTING—PAPER—THICKNESS

GERMAIX, ANDRÉ, and COHEN, ROBERT. Beta-ray gages and their use in the manufacture of paper and thin plastic laminates. Papeterie 73, no. 4: 178-9, 181, 183, 185, 187 (April, 1951). [In French]

The authors describe the principles of beta-ray gages with particular reference to that developed by the Société Saphymo in France, in which the radioactive source is Tl^{204}. The construction and operation of the instrument are briefly outlined. 1 reference and 4 figures. L.E.W.

H. E. MESSMER, LTD., *London.* New dead weight dial micrometer. World's Paper Trade Rev. 135, no. 18: 1283-4 (May 3, 1951).

A brief description of the new dead-weight dial micrometer No. 1602 is given, which is designed for measuring the thickness of very thin sheet material, such as tissue paper, films, or foils up to a maximum thickness of 0.040 inch or 1 mm. The instrument is constructed to conform with the P.M.A. specification for the standard method of determining the thickness and bulk of paper (*cf.* B.I.P.C. 7: 25). 2 illustrations. E.S.

PHYSICAL TESTING—PAPER—VAPOR TRANSMISSION

OSWIN, C. R. A rapid water-vapour-permeability comparator. Chemistry & Industry no. 23: 444 (June 9, 1951).

A new method for the rapid comparison of the permeabilities of thin flexible sheet wrapping materials to water vapor is described. Water "tagged" with radioactive hydrogen (tritium) is used, and the permeating water is sent through a flow-type counter. Counting is effected by the use of a methane proportional counter and a high preamplification between the counter and the rate-meter. The results of some tests are given, and a significant correlation between estimated permeability and the instrument reading was found. Calibrated samples have not as yet been tested. The test times ranged from three to 10 minutes. 1 table and 5 references. M.W.

PLASTIC FILMS (NONCELLULOSIC)

JEBENS, W. J., and LEE, HENRY. Solution-cast film. Modern Plastics 28, no. 10: 104-7, 194 (June, 1951).

Solution-, organosol-, and plasticol-cast vinyl films are technically suited for many different fields of application. The solution-cast films are of immediate interest because of two recent major packaging applications—a plastic bag for home coloring oleomargarine, and a laminate which is used as a military moisture barrier material such as those described under MIL-B-131 and AN-B-20. The principal barrier material consists of vinyl cast film, cotton scrim, polyethylene film, and aluminum foil. Although cast films have many other applications, only limited quantities are now available for civilian use. Vinyl chloride-acetate solution-cast films are manufactured by dissolving suitable copolymer resins and plasticizers in synthetic, low-boiling solvents, casting the solution on a highly polished surface, and evaporating the solvents to deposit a tough, clear, thin film. They differ from calendered film in that they are usually 1 to 2 mils in thickness, whereas calendered films range from 4 to 8 mils; in addition, they possess a high gloss and clarity, whereas calendered film is customarily manufactured with a matte surface. In general, vinyl plastic-cast films are characterized by toughness, high transparency, high tensile strengths and elongations, high tear strengths, outstanding chemical resistance, and a high degree of imperviousness to water vapor and common gases. 2 tables, 8 illustrations, and 10 references. M.W.

PLASTICIZERS IN PAPER

FISHER, HENRY D. Effect of urea and related compounds on the mechanical properties of paper. Tappi 34, no. 6: 276-88 (June, 1951).

The plasticizing action of ureas and formamides has been definitely shown to be due to the effectiveness of the plasticizer molecules themselves, and not to any hygroscopic characteristics of the materials. A study of the effect of ureas and formamides on the load-elongation properties of an alpha sheet has shown that, like water, these materials reduce the tensile strength and elastic modulus of a sheet while enhancing its ability to flow under stress. The urea-type plasticizer has been shown to form bonds with the cellulose—probably hydrogen bonds between the urea carbonyl group and the cellulose hydroxyl groups. The formation of this bond is believed to satisfy reactive hydroxyl groups on the cellulose which would otherwise be involved in moisture sorption, so that one of the effects of the initial increments of a urea additive is a reduction of the moisture content of the sheet. The effectiveness of the urea plasticizers is probably due to their ability to reduce in number and strength the secondary cohesive forces which are largely responsible for the mechanical strength characteristics of the fiber-to-fiber bonds and the fibers in a sheet. The presence of these additives in the cellulosic structure is believed to maintain the cellulose in a state of dry swelling by a mechanical separation of cellulosic chains or chain bundles. The importance of the molecular size of the plasticizer molecule in determining its ability to prevent the deswelling of the cellulosic sheet on drying has been demonstrated. In addition to its effect on the manner in which a sheet reacts to stress, urea has been shown to reduce the shrinkage forces set up in a sheet during drying. 4 tables, 9 figures, and 42 references. E.S.

POWER

HELMICK, DAN S. Power and steam generation. Tappi 34, no. 6: 99-102A (June, 1951).

The author discusses the basic factors which any industry contemplating

new steam- and power-generating equipment should take into account, including the establishment of a heat balance, the type of fuel or fuels, equipment and necessary auxiliaries, coal- and ash-handling facilities, electric distribution system and substations, and selection of personnel. E.S.

MYERS, DAVID MOFFAT. Low boiler pressure—low power economy. Paper Ind. 33, no. 3: 295 (June, 1951); *cf.* B.I.P.C. 21: 722.

The most common cause of high power cost in paper mills resides in the fact that in the original design of older and even more recent mills the initial boiler pressure has been selected too low; the consequence is that the power plant is out of balance, because the full quota of by-product energy is not available. The determining factor in the selection of boiler pressure is the amount of process steam required per hour as compared with the kilowatt demand. A chart is included in which the steam rate is plotted against the throttle pressure for a 5000-kw. turbine. The author explains that in paper mill power-plant modernization the most important factor is the selection of a sufficiently high throttle pressure to insure not only an efficiently balanced plant for expected loads, but also for future loads which are likely to be required under present trends. 1 figure. E.S.

PRINTING AND PRINTER'S INK

BOWLES, R. F. Ink coverage and the duct. The Penrose Annual 45: 108-11 + 2 plates (1951).

The author explains that ink coverage depends on the roughness (or smoothness) of the paper, the bulk value or specific volume of the ink, and its color strength; it can be determined without reference to the duct, which is the primary mechanism for maintaining the requisite flow of ink from the press to the sheet of paper. He shows that there is no relationship between poor ink coverage and the number of teeth in the duct. The results of empirical flow tests of several inks of varying consistency are reproduced in a number of curves which give a general picture of the rheological behavior of these inks. Evidence is presented which indicates that it is the consistency of the ink which is the determining factor in the number of teeth required on the duct for distributing a certain volume of ink. This number can be determined mathematically from the height and slope of the empirical flow test curves. 3 tables and 3 figures, including an illustration of the apparatus for making empirical flow tests. E.S.

DAY, FREDERICK T. Paper conversion and usage. No. 1. Paper choice and its influence upon the success of the printed work. World's Paper Trade Rev. 134, no. 18: 1252, 1254, 1256, 1259 (Nov. 23, 1950).

The first of a series of articles on the techniques and characteristics of paper processing, converting, and printing deals with the selection of grade, quality, and finish of paper for the particular job. The importance of use requirements with particular reference to the printing industry, greater cooperation between papermakers and printers, and the educational value of plant visits are stressed. A list of the articles to be included in this series is appended. E.S.

DAY, FREDERICK T. Paper conversion and usage. No. 6. Paper surface—suitability to block screens and typeface. World's Paper Trade Rev. 135, no. 7: 466, 471 (Feb. 15, 1951).

The use of china clay as a filler and coating agent is discussed, as well as the process of water finishing, and the resulting effects on the paper surface

are noted. The correct paper surfaces for the different printing processes have been formulated, and it is largely a question of the right choice of paper for the job; an outline of the most suitable types of paper employed for the various screens in letterpress printing is included. Factors which influence the appearance of type are: the use of coated or uncoated paper, texture, finish, color, and the presence of gloss. One selected type printed on a variety of papers will result in various reproductions, impressions, and tones of type. Quantity, price, quality, and paper preference are some of the considerations in paper selection; however, the most important factor is suitability for the job. 2 illustrations. E.S.

MEECH, F. B. Some printing defects investigated by PATRA. The Penrose Annual 45: 112-13 + 1 plate (1951); *cf.* B.I.P.C. 21: 642.

The defects included the following problems: an untarnished setoff on gold bronze prints, the fading of a varnishing impression on gold-coated paper, the corrosion of steel engravings in storage, and an unexpected mottle on a catalog cover. 6 figures. E.S.

MORRIS, CHARLES V. Paper man can help customer handle complaints effectively. Paper & Paper Products 92, no. 19: 8-9 (June 20, 1951).

The author emphasizes the importance of calling the paper supplier at the first sign of trouble on the printing presses; the paper manufacturer's trouble shooter can in many instances solve the problem promptly and restore presses to production. When complaints are severe, he can expedite the handling of claims and generally help to hold lost time and materials to a minimum. A check list is included in which the items of importance are specified, which should be presented to the trouble shooter as soon as he arrives, thereby saving valuable time. E.S.

WELP, GEORGE. How to choose the right ink. Am. Printer 132, no. 5: 36-7, 68; no. 6: 30-1 (May, June, 1951); *cf.* B.I.P.C. 21: 419.

The author discusses the many variables which can influence the performance of inks, and points out that these variables must be known by the inkmaker in order to prepare ink for a particular job. To obtain the best possible formulation, the printer should provide the inkmaker with complete information concerning the printing process and type of press to be used, and the type of material and the kind of job to be printed. Brief reference is made to the ink requirements for certain special purposes, such as soap wrappers and cartons, cellophane, glass, meat wrappers, cedarized bags, "strike-anywhere" matches, and stuffers for food products. M.W.

ZETTLEMOYER, A. C. Significant advances in package printing. Am. Ink Maker 29, no. 6: 31-2, 59, 61 (June, 1951); Am. Boxmaker 40, no. 5: 19-20 (May, 1951); Am. Paper Converter 25, no. 6: 9, 46-7 (June, 1951).

Letterpress accounts for most of the printing of packaging materials because it permits strong, solid prints, sharp, clear-cut effects, and excellent multicolor work. Steam-set inks are used for letterpress printing of corrugated boxboard, kraft bags, bread wraps, and paraffin-coated cartons. Rapid drying, nontoxicity, and a pleasant odor make them desirable for this type of printing. The use of aniline printing has expanded to about 10% of the

packaging-printing output. Most glassine, foil, and cellophane wraps, as well as the new plastic films and paper-film laminates, are printed with aniline, and it is also used on coverings for setup boxes, display cartons, and kraft and jute liners for corrugated boxes. Offset lithography accounts for only about 5% of packaging printing, but it is on the increase. Rotary gravure printing is used on materials as diverse as boxboard and plastic films, and is used for about 10% of packaging printing. The gravure process is one of the easier methods of running four colors on boxboard and is used for the production of soap cartons and bread wraps. A new use of gravure is made in the printing of tin plate which is subsequently cut and formed into cans. In choosing a process for a specific job, among various factors to be considered is the cost of ink versus quality. The National Printing Ink Research Institute has developed tests for viscosity and tack and a device, called the Rubometer, for testing the scuff resistance of inks. 1 table and 1 illustration. M.W.

PULP STONES

BUZZUBETZ, B. T. A shield to assist pulpstone sharpening operation on the Waterous grinders, a gadget competition entry. Pulp Paper Mag. Can. 52, no. 6: 116 (May, 1951).

A brief description of the shield and its application is given. 1 illustration. E.S.

RAMIE

WRIGHT, C. E. Ramie fiber developments. Paper Trade J. 132, no. 22: 13 (June 1, 1951).

The chief drawback in the cultivation of ramie fiber in this country has been the difficulty of decorticating the plant easily and economically. Newport Industries, Inc., has developed a machine for this purpose and is carrying on a project for cultivating the fiber in the Everglades section of Florida. Most of the two million-pound annual output from this source is going into textiles, but the high cellulose content and strength of the fibers make it suitable for high-grade papers for special purposes such as bank notes or bond papers, and with increased production more of the fiber will probably be used for papermaking. M.W.

REPORTS—PREPARATION

CAMPBELL, W. BOYD. The organization of reports. Pulp Paper Mag. Can. 52, no. 6: 110-11 (May, 1951).

The author presents a plan for the presentation of reports which he suggests as the most satisfactory arrangement for the reader. The following order is recommended: (1) an introductory section which contains a statement of the question, a brief discussion of its importance, and a concise statement of the answer which was found, (2) a description of the experimental work; (3) an analysis and discussion of the experimental work; (4) a presentation of miscellaneous findings made in the investigation, (5) suggestions or recommendations by the author as a consequence of the work, and (6) a bibliography. M.W.

RESIN, SYNTHETIC

SAUER, R. O. Uses of commercial silicone products. Gen. Elec. Rev. 54, no. 6: 39-44 (June, 1951).

Following a review of the raw materials, methods of preparation, and molecular structure of silicones, some of their applications are described. Their uses are geared to four general properties which they exhibit: resist-

ance to heat and cold, nonsticking or release qualities, production and possession of useful surface properties (e.g., inhibition of foam and water repellency), and general inertness. 1 table and 15 figures. M.W.

SAFETY

MILNE, C. C. Pain & Sorrow, Inc. Pulp Paper Mag. Can. 52, no. 6: 170, 172, 177, 179, 181 (May, 1951).

Methods of minimizing the number of industrial accidents are discussed. The most effective means is a safety campaign which involves the co-operation of all employees from top management through the ranks of labor and through which the employees are trained to recognize and anticipate hazards. The responsibility for carrying out a safety program is largely that of the foreman, but organized labor also plays an important role. The record of accident prevention has shown an improvement over the past years, but the industrial expansion under way at present creates new hazards, and added concern for accident prevention is essential. Statistical data are included; the limitations of statistics for showing all losses involved in accidents are pointed out. 2 tables and 2 figures. M.W.

SEMI-CHEMICAL PULPING PROCESS

KELLER, E. L., and MCGOVERN, J. N. Effect of recycling spent liquor in semichemical pulping. Tappi 34, no. 6: 262-5 (June, 1951).

A series of neutral sulfite semichemical digestions of quaking aspen was made in which the spent liquor from each digestion was collected and used in the next digestion after fortifying with additional cooking chemicals. All other digestion conditions were maintained constant. Approximately 85% of the total liquor in the digester at the end of the digestion was recovered, and 80% was re-used. The specific gravity and total solids content of the spent liquor closely approached maximum or equilibrium values after 10 cycles of re-use. The equilibrium values after 11 cycles were 212 grams per liter of total solids with 114 grams per liter of sulfated ash in comparison with 76 and 44 grams per liter, respectively, after the first cycle. The pulp yield increased from about 74 to 76% in reaching this equilibrium, and the pulp brightness decreased from 51 to 47%. The lignin content of the pulps increased slightly but their strength properties did not change during the recycling process. 3 tables, 1 figure, and 5 references. E.S.

MARPILLERO, PAOLO. The Abikraft process for semichemical pulp applied to Asplund fibers. Ind. carta (Milan) 4, no. 10: 111-14 (October, 1950); Bull. assoc. tech. ind. papetière 5, no. 3: 116-19 (April, 1951). [In Italian and French]

Reference is made to the work by Hägglund (*cf.* B.I.P.C. 7: 58) who explained why the standard bisulfite process cannot be applied to isolated fibers, and by Jayme and Wettstein (*cf.* B.I.P.C. 9: 242) who concluded that Asplund fiber is no suitable raw material for further chemical conversion. The author shows that the mild conditions of the Italian semichemical Abikraft process (0.8% sulfur dioxide, pH 3-4, and a cooking period of nine hours at 110°C.), when applied to Asplund fiber, will result in high yields (84-90%) of a suitable semichemical pulp; the costs of chemicals and steam are low. When the process was applied to sawdust and refiner tailings, the resulting unbleached pulp at 30° S.-R. had the following properties: a breaking length of 4500-6000, burst factor of 28-35, and extremely low tear and folding endurance. Such pulps with excellent dewatering properties are claimed to be suitable for wallboard manufacture. E.S.

PAPER INDUSTRY. Bathurst makes semichemical pulp from hardwood. Paper Ind. 33, no. 3: 286-8 (June, 1951); *cf.* abstract below.

The new BCM mill at Bathurst, N.B. is described. 2 flow diagrams and 5 illustrations. E.S.

PAPER MILL NEWS. The Bathurst BCM mill. Paper Mill News 74, no. 25: 10-12 (June 23, 1951); *cf.* abstract below.

A condensed description of the new semichemical pulp mill at Bathurst, N.B. is presented. 1 flowsheet, 5 illustrations, and 2 references. E.S.

PULP AND PAPER MAGAZINE OF CANADA. B C M, Bathurst's new product. Pulp Paper Mag. Can. 52, no. 6: 78-87 (May, 1951).

An illustrated description of the new semichemical pulp mill using hardwoods at Bathurst, N.B. is given. The hardwood species (poplar, beech, maple, and birch) are brought to the mill by truck from an area about 30 miles from the mill. Chip preparation and handling, cooking with a modified kraft liquor in two semichemical pulping units, treatment in an Asplund Defibrator, brown stock refining in Sutherland refiners, and washing in a two-stage Swenson-Nyman washer are described. The BCM (Bathurst corrugating medium) stock is mixed with kraft pulp and refined in one jordan and two Sutherland refiners operating in parallel. The mixed, refined pulp is formed into corrugating board on a 145-inch Walmsley Fourdrinier. Brief reference is also made to the subsidiary box plants of the company, Shipping Containers Ltd. with two plants in Montreal, and Kraft Containers Ltd., of Hamilton, Ont., where the capacity has recently been doubled. 1 flowsheet and 22 illustrations. E.S.

SETUP BOXES

NATIONAL PAPER BOX MANUFACTURERS ASSOCIATION. Best set-up boxes. Modern Packaging 24, no. 10: 105-9 (June, 1951); Boxboard Containers 69, no. 702: 28-30, 32, 34, 36, 38, 40, 42, 45 (June, 1951); Am. Boxmaker 40, no. 6: 16-19, 22-23, 26-30 (June, 1951).

Awards were made in the 1951 Set-up Paper Box Competition in four classifications: end-use superiority, superiority of construction, best display boxes, and best artistic design. The winners of first and second awards and honorable mentions in each class are described. A list of the panel of judges is appended. 21 illustrations in the first and 66 illustrations in the two other references. M.W.

SHIPPING CONTAINERS

ANON. New all-in-one packs. Brit. Packer 13, no. 5: 24-5 (May, 1951).

A type of container with built-in internal supports eliminates the need for shredded paper or straw to protect the contents. The internal fittings are designed in such a manner that when the box is assembled, they open out and form a structure that distributes the weight of the contents on all faces of the box, and thus protects the contents from shock or impact on the corners or sides of the box. One of the chief advantages of this pack is that it will fold flat for storage without removal of the internal fittings. Some of the various applications of the container are described and illustrated. Tests with this type of pack have shown that satisfactory protection of the contents is provided. 5 illustrations. M.W.

THE RAULAND CORPORATION, *Chicago.* Packaging engineers systematize handling of television tubes. Packaging Parade 19, no. 221: 58-9, 113 (June, 1951).

Television picture tubes present two definite problems to their manufacturers: packaging and intraplant handling. The latter difficulty has been solved at Rauland by an overhead conveyor system which efficiently moves tubes from one testing station to the next with minimum chance of breakage. Packaging the tubes is difficult not only because they are large, heavy, expensive, and very fragile, but also because tube manufacturers have different preferences as to how bulk shipments should arrive from glass manufacturers. A committee has been assigned the task of standardizing packing cases. The container now in use is a 24-unit duplex arrangement; the lower container is equipped with a paper pallet. An intricate arrangement of trays and dividers serves as interior packing, and Kimpak (cellulose wadding) sheets protect the viewing screen surfaces from being scratched during transit. The pallet is made of paperboard tubing treated with water-resistant wax, and provides a savings in shipping weight of the container. The container gives excellent protection to the tubes and assures that if the vacuum of one tube should be broken, any consequent broken parts are confined within the container. 8 illustrations. M.W.

SILICATE OF SODA

MCDOWELL, R. R. "Modified" sodium silicate in the paper industry. World's Paper Trade Rev. 135, no. 18: 1308, 1313-16 (May 3, 1951).

The possibilities of improved operation with activated silica for water softening and white water recovery are discussed. 1 figure and 10 references. E.S.

PHILADELPHIA QUARTZ COMPANY. [Stiffness of paperboard] Silicate P's & Q's 31, no. 4: 2 p. (April, 1951); *cf.* B.I.P.C. 21: 493-4.

The effects of sodium silicate on the increase in stiffness in paperboard and possible economies in fibrous raw materials are discussed. E.S.

SODA ASH

STENERSON, HARRY. Behind the markets. Chem. Eng. News 29, no. 24: 2430; no. 25: 2522 (June 11, 18, 1951).

With reference to the government attitude that no expansion in soda ash capacity is needed and that 5.5 million tons is all that will be required in 1953, emphasis is placed on the constant, slow, upward trend in the alkali-consuming industries whicl should not be expected to stop during periods of military expansion. One of the fastest-growing uses of soda ash is that of semi-chemical pulping of hardwoods which has increased tenfold in the past 10 years. Soda ash consumption for pulp and paper amounted to only 4% of the total during the 10-year period ending in 1949. Detergent manufacture, a number of chemical processes, and metallurgical requirements will also demand increasing quantities, so that the assumption that industry will need not more than 5.5 million tons in 1953 appears to be highly venturesome. 1 table and 1 diagram. E.S.

SPECIFICATIONS

DAY, FREDERICK T. Paper conversion and usage. No. 7. Required

standards of strength in krafts & other papers. World's Paper Trade Rev. 135, no. 9: 584, 586, 588 (March 1, 1951).

The author discusses some of the materials which have recognized standards of strength, such as krafts, waterproof wrappings, fiberboards, stay paper for boxes, gummed tapes, etc. A standard for bag paper is urgently needed. Not every job requires a paper with specified standards of strength, durability, and permanence, but where these factors are obviously required, particularly in packing and packaging, they should receive the consideration which the ultimate use of the paper demands. E.S.

TRUESDALE, FREELING M. Printing paper end-use specifications. Tappi 34, no. 6: 105-7A (June, 1951).

The author discusses the importance of the knowledge of end-use requirements of his paper by the manufacturer and the use of tests which will indicate the properties essential to the end use; examples of case histories are given. When accurate end-use data are available, significant specifications can be written which will result in the manufacture of paper properly suited for printing and end-use requirements; useless specifications can thereby be eliminated. E.S.

STARCH

KERR, RALPH W., and CLEVELAND, FRANK C. The action of crystalline β-amylase on corn crystalline amylose. J. Am. Chem. Soc. 73, no. 6: 2421-4 (June, 1951); *cf.* B.I.P.C. 20: 349.

The object of this investigation was to study the action of a crystalline β-amylase on a highly purified amylose in order to decide which of two possible mechanisms proposed, "single-chain" or "multiple-chain" action, is the more probable one. The hydrolysis was interrupted at approximately the midpoint. The higher-polymer fraction of the hydrolyzate was separated by alcoholic fractionation and crystallized as platelets from aqueous butanol. Osmotic pressure measurements, ferricyanide oxidation, and instrinsic viscosity determinations showed it to be the same as the original amylose in average chain length and in chain-length distribution. The low-polymer fraction, estimated as maltose by ferricyanide oxidation, was analyzed by paper chromatography and found to consist only of maltose with possibly trace amounts of maltotriose. The quantitative determination of the hydrolyzate as maltose and residual amylose molecules with a chain length identical to the original substrate, strongly favors the theory that β-amylase operates by a single-chain mechanism. These results disprove the theory that at any ratio of enzyme to substrate, all linear chains are attacked simultaneously. 3 tables, 1 figure, and 17 references. E.S.

STEPHENSON, EDWARD E., JR. Potato starch in papermaking processes. Part 1. Paper Ind. 33, no. 3: 288-91 (June, 1951).

A survey of current literature on the use of potato starch in the paper and paperboard industries is presented under the subheadings: potato starch in the United States, surplus potatoes yield starch, classification of starches, general starch usage in paper manufacture, use of starch in the beater, approaches to beater application of starches, and strength increases resulting from beater application. 2 tables, 11 photomicrographs, and 22 references. E.S.

STATISTICAL METHODS

SOOY, WALTER E. Quality control . . . by statistical methods. Boxboard Containers 69, no. 702: 22-4, 26, 85 (June, 1951).

The Gardner Board and Carton Co., Middletown, Ohio, has successfully applied principles of statistical quality control to the production of folding cartons and boxboard. The program has resulted in increases in the quality of work, reduction of spoilage, and a personal feeling of accomplishment for the individual worker. To illustrate the operation of quality control, the plan used in controlling paper weight is presented. This involved a definition of quality (desirable weight), the establishment of limits of variation, and a method of providing workers with quality information. To evaluate the quality of paper cartons mathematically, a numerical index called the defective quality number was established. By plotting this value a continuous record of quality control is possible, and any substandard operations can be readily detected. 1 table and 3 figures. M.W.

STREAM POLLUTION

ELDRIDGE, E. F., and ORLOB, G. T. Investigation of pollution of Port Gardner Bay and Snohomish River estuary. Sewage Ind. Wastes 23, no. 6: 782-95 (June, 1951).

A survey of water conditions in Everett Harbor and the lower Snohomish River was undertaken by the Washington Pollution Control Commission during the fall of 1949. The survey involved a determination of the effects of the discharge of domestic sewage from Everett, Wash., and industrial wastes, especially the discharge from two sulfite pulp mills and one soda pulp mill. A pollutional barrier was demonstrated to exist in the estuary of the south branch of the river. The barrier is caused by the above-mentioned wastes and has resulted in large kills of herring, candlefish, and young salmon, primarily the result of low oxygen conditions and possibly some unproved toxicity. 5 tables and 7 figures. M.W.

SULFITE MILLS

CANADIAN PULP AND PAPER INDUSTRY. The story of Columbia Cellulose. Can. Pulp Paper Ind. 4, no. 6: 12-107, 112-14 (interspersed with advertisements) (June, 1951); *cf.* B.I.P.C. 20: 274.

Almost the entire issue deals with the new 200-ton sulfite mill of Columbia Cellulose Company Limited on Watson Island, nine miles south of Prince Rupert, B.C., which started operations in April, 1951. The description includes the following articles: Anon. The story of Columbia Cellulose, p. 12-18; Druce, Eric. Now and for a hundred generations, p. 19-22, 24-5; Anon. Prince Rupert has a history, p. 28, 32; Vincent, Rex. Acetate pulp plays an increasing role in modern living, p. 34, 36 (*cf.* also Pulp & Paper 25, no. 6: 60, 62 [June, 1951]); Anon. Unique construction employed, p. 38-41; Anon. Engineering skill brings water seven miles to mill, p. 42, 44; Anon. Gravity filter for color removal, p. 46-9; Anon. The steam plant, largest of its kind in Canada, p. 50-2, 54; Anon. Log handling is fully automatic at Columbia, p. 56, 58, 60; Anon. Chip storage, p. 62, 64; Anon. Acid plant of model design, p. 66, 68; Anon. Chemipulp hot acid cooking and recovery adopted, p. 70, 72, 74, 76; Anon. Heating and ventilating, p. 78, 80; Anon. The use of Lithcote in the pulp and paper industry, p. 82, 84, 86, 112-14; Anon. Management at Columbia, p. 88, 90; Anon. Construction's key men, p. 92; Anon. The men behind production, p. 94, 96, 98; Anon. Woods personnel, p. 100, 102; Anon. Large pumps used on refiners, p. 104; Anon. The machine room, p. 104, 106-7. Most of the articles are profusely illustrated. E.S.

PAPER MILL NEWS. Columbia Cellulose starts operations. Paper Mill News 74, no. 23: 12-14, 16, 18, 20, 25 (June 9, 1951).

An illustrated description is given of the installations of the new sulfite

mill of the Columbia Cellulose Co. Ltd. on Watson Island, near Prince Rupert, B.C. 8 illustrations and 1 flowsheet of the Chemipulp hot acid system. E.S.

PULP & PAPER. Celanese Corporation of America enters the pulp industry. Pulp & Paper 25, no. 6: 42-4, 46, 48, 50-1, 54-5, 58, 60, 80 (June, 1951).

A detailed description of all departments of the new sulfite mill at Watson Island, B.C., of the Columbia Cellulose Co. Ltd. is given. The initial production is 200 tons of acetate-grade, high-alpha pulp per day. Extensive timber limits in northwest British Columbia will be operated on a sustained-yield basis under a forest management license, the first practical test of the forest management program initiated by the provincial government three years ago. Numerous illustrations including 2 flow diagrams. E.S.

SULFITE PROCESS—AMMONIA BASE

LAFOND, L. A., and HOLZER, W. F. Commercial sulphite production experience with ammonia-base acid. Tappi 34, no. 6: 241-7 (June, 1951).

Ammonia-base sulfite acid has successfully replaced dolomite-base acid for the cooking of western woods at the Lebanon, Ore. mill of the Crown Zellerbach Corp. The conversion required very little change in equipment and has resulted in greater pulp-production capacity, milder cooking conditions, better-quality pulp except for color, reduced screenings, better pulp yield, generally improved operating conditions, and savings in operating chemicals and maintenance. Against these advantages has been the cost of ammonia, and an increased slime growth. The first is more than offset by direct savings; the second has been controlled by use of organic mercurial slimicides. The benefits from the use of ammonia are attributed to its ease of handling, its solubility, and its rapid penetration of wood as the base of the cooking acid. No evidence is available as to any difference in its reaction with lignin. 3 tables, 3 figures, and 7 references. E.S.

SULFITE WASTE LIQUOR

CHEMICAL WEEK. Waste makes haste. Chem. Week [previously Chem. Inds. Week] 68, no. 21: 10 (June 9, 1951); *cf.* B.I.P.C. 21: 195-6.

Reference is made to the disposal of sulfite waste liquor by its use as a road binder by several Wisconsin mills. No concentration or other treatment of the liquor is necessary. The waste from the digester is pumped directly into tank-truck sprayers. County highway departments are not charged for the waste liquor, merely for hauling costs. A mile of road within 10 miles of the plant can be treated for roughly $100.00, whereas other treatments are considerably higher in central Wisconsin. 1 illustration. E.S.

GEHM, HARRY W. Pulp and paper mill wastes. Sewage Ind. Wastes 23, no. 6: 765-8 (June, 1951).

The problems presented by spent sulfite liquor in by-product recovery and treatment are discussed, and some of the projects which are under way for the solution of these problems are described briefly. M.W.

PAPIRINDUSTRIENS FORSKNINGSINSTITUTT. Spent sulfite liquor for binding dust. Norsk Skogind. 5, no. 4: 96, 98 (April, 1951). [In Norwegian]

Brief reference is made to experiences in the United States, Sweden, and Switzerland with spent sulfite liquor (I) as a road binder in comparison with calcium chloride. Particular consideration is given to the economic aspect under Swedish conditions, where the extensive transport organization required for (I) is now found to be offset by recent price increases of imported calcium chloride. The fact is also stressed that before the last war (I) was successfully applied to certain Swiss mountain roads without permanent surface leading over passes in the Alps, where (I) had to be transported far greater distances than found economically feasible in Sweden (100 km. from the mill). 1 table. E.S.

SULFUR

CHEMICAL WEEK. Sulfur: enough by '52. Chem. Week 68, no. 24: 33-4 (June 30, 1951).

The current yearly difference between the supply and demand for sulfur is estimated to be about one million long tons; however, this deficit will be erased by the 1.2 million long tons of new capacity which will be added to the industry's 1950 capacity. Some of the probable new sources include additional capacity which will employ the Frasch process, an increase in Italian production, greater utilization of pyrite, and the use of the new process for the recovery of sulfur from surface deposits (*cf.* B.I.P.C. 21: 586). Certain new supplies will come from hydrocarbon gases, smelter gases, and anhydrite. These various sources should provide an adequate sulfur supply by 1952. 2 tables and 1 illustration. M.W.

TALL OIL

STENERSON, HARRY. Tall oil expansion. Chem. Eng. News 29, no. 23: 2332 (June 4, 1951).

Tall oil now ranks among the important chemicals, and its production and consumption continue to grow. The production of crude tall oil products in 1950 amounted to 153,932 tons, an increase of 38,950 tons over 1949. During the first quarter of 1951 the output showed an increase of about 111% over the corresponding period of 1950. The percentagewise breakdown in factory consumption of refined tall oil for 1950 is as follows: soap, 17.6%; chemicals, 6.7%; paint and varnish, 36.5%; lubricants and greases, 1.3%; and other products, 37.9%. 1 table and 1 chart. M.W.

TURPENTINE

SMEDSLUND, TOR. The dimethyl sulfide content of sulfate turpentine and its recovery in pure form. Paper and Timber (Finland) 33, no. 5: 185-8 (May, 1951). [In Swedish; English summary]

Data concerning the formation of dimethyl sulfide during sulfate cooking are scarce. To investigate the amount of dimethyl sulfide present in sulfate turpentine and its possible yield, samples from all nine Finnish sulfate mills were analyzed; the content was found to vary from 7 to 35 g./l. No direct relationship between the dimethyl sulfide content and the cooking method or type of wood could be established. The analytical method which was employed is based on the reaction of dimethyl sulfide with methyl iodide in ethanol, which gives trimethylsulfonium iodide. The reaction is quantitative in 20 hours at a temperature of 35-40°C., and the iodide can be titrated with silver nitrate. Dimethyl sulfide free from methyl mercaptan can be obtained by treating the forerun of a sulfate turpentine distillation column with strong sodium hydroxide and removing the last traces with iodine. When it is

further treated with gaseous hydrogen chloride, some additional malodorous compounds are polymerized. In conclusion, brief reference is made to the possibilities of purifying sulfate turpentine; the treatment with alkaline hydrogen peroxide solutions has given definite, positive results. 1 table and 7 references. E.S.

ULTRASONICS

PENN, W. S. The use of ultrasonics in packaging. Brit. Packer 13, no. 5: 26-7, 36 (May, 1951); *cf.* B.I.P.C. 21: 655-6.

Following a discussion in which ultrasonics are defined and their characteristics and effects are described, some of their possible applications in the packaging industry are considered. These applications include materials testing, the sterilization of food and other products after packaging, and the general acceleration of various chemical reactions. 13 references. M.W.

WASTE PAPER

BRECHT, WALTER. Developments in stock preparation from and purification of waste paper in America. Das Papier 5, no. 7/8: 124-7 (April, 1951). [In German]

The author describes old and new methods of waste-paper regeneration in America, particularly with breaker beaters and pulpers; rag catchers and junk removers; the regeneration of wet-strength paper; and deinking methods. L.E.W.

HOESCH, ROBERT. New developments in the field of stock purification. Das Papier 5, no. 7/8: 121-4 (April, 1950). [In German]

Reference is made to vortex-type pulp separators built by the German firm O. Dörries in Düren, the Odag pipe sand catcher for coarse purification, and the Odag vortex separator for the fine screening of impurities. The principles of the units and their mode of operation are described. They are designed for a 1% stock density and are particularly suitable for the cleaning of waste papers. An example is cited where the ash content of particularly soiled, nondusted cement bag stock (using 0.5% stock density) was reduced from 18.6 to 2.3%. 6 illustrations. L.E.W.

TRENSCHEL, RUDOLF. The hitherto known stock-preparation machines and plants for waste paper. Das Papier 5, no. 7/8: 113-21 (April, 1951). [In German]

The author describes machinery in use in Germany for the sorting and cleaning of waste paper, its batchwise treatment in kollergangs and soaking drums, and its continuous treatment in different types of breaker beaters. Reference is also made to various hookups of equipment. 5 tables and 19 figures. L.E.W.

WATER AND WATER TREATMENT

ANON. Water treatment in the paper industry. World's Paper Trade Rev. 135, no. 16: 1149-51 (April 19, 1951).

A brief description of the Permutit Spiractor, a lime-process water softener, and its operation is given. It involves a small closed reaction tank of inverted conical form, in which the reaction between the raw water and the treatment chemicals takes place in the presence of a dense bed of catalyst granules (calcium carbonate-coated silica sand), which are maintained in violent agitation by the water flow. A reaction time of only 10 minutes is required. The

Spiractor has many existing and potential applications in the treatment of industrial water supplies; with final base-exchange softening for the removal of residual hardness it is particularly suitable for softening boiler feed water in the paper industry. 2 illustrations. E.S.

COLAS, R. Water used in papermaking. Bull. assoc. tech. ind. papetière 5, no. 3: 105-11 (April, 1951). [In French]

A general discussion of water and water treatment in the paper industry is presented. L.E.W.

SHERWOOD, NIAL. Four million GPD from single caisson well. Paper Trade J. 132, no. 23: 18-20 (June 8, 1951).

The installation and operation of a caisson well which is used to supply the city water of Warwick, N.Y., is described. The well is a reinforced concrete vertical hollow shaft with open bottom, which is provided with a circumferential Everdur screen at the bottom. It is potentially capable of yielding 4,000,000 gallons per day, and the water from it is odorless and completely free of suspended solids. 4 illustrations. M.W.

WAXES

ESSO OILWAYS. Care and storage of wax. Tappi 34, no. 6: 121-2A (June, 1951).

About 80% of the wax produced in the United States is used by the paper industry. Following a brief description of the methods used in shipping liquid and solid crude, refined, and microcrystalline waxes, useful directions for the correct storage of the products by the consuming industries are given. Wax is very liable to oxidize and pick up odors from the surrounding atmosphere; it should always be stored in such a manner that it does not acquire contaminants and is not exposed to high temperatures and sunlight. E.S.

WOOD—CHEMISTRY

ERDTMAN, H. Organic chemical research in the Department of Organic Chemistry, Royal Institute of Technology, Stockholm, during the years 1945-1950. Svensk Kem. Tid. 63, no. 2: 43-66 (February, 1951). [In English]

A comprehensive review is presented under the headings: forest chemistry, fungi and lichens, heartwood constituents of conifers, the chemistry of lignin and the sulfite process, herbicides, the reactivity of various quinones, sugar chemistry, and miscellaneous subjects. 82 references. E.S.

WOOD—EXTRACTIVES

WOLCOTT, GEORGE N. The termite resistance of pinosylvin and other new insecticides. J. Econ. Entomol. 44, no. 2: 263-4 (April, 1951).

Pinosylvin from Scotch pine heartwood, 0.01% in aqueous alcohol or acetone, was used in impregnating flamboyánwood (*Delonix regia* [Bojer] Raf.). The treated samples were placed in Petri dishes with fresh West Indian dry-wood termites (*Cryptotermes brevis*). For two months no termites were able to live more than two to three days in a dish containing a treated sample, and the wood was not definitely eaten even after five months. These results are compared with those obtained with about 19 other chemicals.

Although many of these were also initially very toxic to termites, none acted at such great dilution or for so long a time as did 0.01% pinosylvin. 1 table and 6 references. L.E.W.

WOOD DISTILLATION

HALLONQUIST, EARL G. Catalytic hydrogenolysis of wood. Ind. Eng. Chem. 43, no. 6: 1427-30 (June, 1951).

Hydrogenation has shown considerable promise as a means of obtaining useful chemical products by the controlled decomposition of wood. The present investigation was carried out to explore the possibilities of hydrogenolysis (concomitant hydrogenation and hydrolysis) in converting wood to distillable liquids. Optimum yields of slightly more than 50% of the weight of the wood were obtained as nonaqueous distillable liquids by this method. Nickel catalysts were the most effective, and yields varied considerably, depending on the amount of catalyst used and the time and temperature of reaction. The quantities of gas and water formed, and the amount of unreacted material remaining, were determined for various conditions. The ultimate feasibility of the conversion of lignocellulose to chemicals and oils is of continuing scientific and industrial interest, and the information contained in this report should indicate the possibilities for wood liquefaction by methods involving hydrogenolysis. 2 tables, 1 figure, and 15 references. E.S.

WOOD OPERATIONS

HARRISON, F. A. The impact of mechanized logging on industrial-relations. Pulp Paper Mag. Can. 52, no. 6: 88-90 (May, 1951).

In speaking of mechanized logging in a broad sense, i.e., any process or means which will tend to increase the production per man-day through the use of machines, one of the principal factors to be affected by mechanization is transportation. The results of mechanized transportation are: (1) more workers in the forest per unit of wood cut because of the auxiliary jobs created for the operation and maintenance of machinery, and subsequently, the increase of manpower required for forest management operations, (2) greatly improved living conditions for the worker, and (3) the creation of new jobs at a higher level of pay. The effect of mechanization in the field of production is generally to decrease the number of workers per unit of wood cut, and to raise the qualitative requirements of the workers. This will eventually result in requirements and pay comparable with industrial workers. The long-range effect of this will be year-round forestry operations and a population shift of the submarginal farmers who provide seasonal labor. The ultimate result will be beneficial to both the worker and the Canadian economy as a whole. M.W.

McCOLL, B. J. Developments in mechanical logging during 1951. Pulp Paper Mag. Can. 52, no. 6: 142, 145, 147-50 (May, 1951); *cf.* B.I.P.C. 20: 751.

The activities and developments in mechanical logging inspired by the Cable Yarding, Mechanical Hauling, and Cutting Tools Committees of the Woodlands Section of the Canadian Pulp and Paper Association are reported. 10 figures. M.W.

PULP & PAPER. How Southern Kraft does it. Part IV. Pulp & Paper 25, no. 6: 70, 72, 76, 78, 80 (June, 1951); *cf.* B.I.P.C. 21: 739.

The organization of the woods operations west of the Mississippi in Louisiana and Arkansas is described. 10 illustrations. E.S.

X-RAY RESEARCH

MUKHERJEE, S. M., SIKORSKI, J., and WOODS, H. J. Micellar structure of native cellulose. Nature 167, no. 4255: 821-2 (May 19, 1951); *cf.* B.I.P.C. 20: 236-7.

With increasing severity of the treatment of cotton and ramie with sulfuric acid, the ultimate product of the dissolution appears to consist of particles between 500 and 2500 A. in length and with a roughly constant cross section (50 A. thick and 150-200 A. wide). Brittle transparent films are prepared from the colloidal solution of larger aggregates obtained from earlier stages of disintegration. X-ray examination of the films shows that the 101 planes are preferentially oriented parallel to the plane of the film and, since the flat aggregated particles must tend to lie parallel to the same plane, the crystal axial orientation tends to persist throughout the aggregates. Although specimens which contain only the ultimate particles have not been prepared, films from solutions of very small aggregates show similar orientation effects and indicate that the ultimate particles are thinnest in the direction normal to the 101 crystallographic planes. X-ray photographs of less drastically treated material show a strong equatorial small-angle scattering and an equatorial streak which are due to some effect in the direction of the normals to the 101 planes. 1 figure and 3 references. M.W.

YELLOWING OF PAPER

CENTOLA, G. The yellowing of papers. Bull. assoc. tech. ind. papetière 5, no. 3: 111-15 (April, 1951). [In French]

Yellowing of paper has been ascribed to one or more of the following reasons: lignin, especially in papers containing mechanical pulp; insoluble degradation products resulting from overbleaching of the pulp; wash waters containing iron; and oxidized resins used in sizing. Other factors may obtain, and the author has made a study of the loss in brightness in pulp sheets prepared from the following: cotton linters used for acetylation (I), spruce sulfite used for rayon manufacture (II), spruce sulfite paper pulp (III), spruce sulfate (IV), spruce semichemical pulp (V), and various straw pulps (VI). All pulps were bleached, sometimes in three to five steps, with a final chlorine dioxide flash treatment. Wet and air-dried pulp sheets were then exposed to infrared and ultraviolet filtered and unfiltered light, in atmospheres of air, oxygen, hydrogen, and nitrogen. The following general conclusions were reached: The nature of the surrounding gas has no appreciable effect on the yellowing of sheets exposed to infrared light. The presence of oxygen decreases yellowing when nonfiltered light from a mercury-vapor lamp is used. Yellowing is inappreciable when sheets were exposed to filtered ultraviolet light; in fact, in oxygen and with moist sheets the brightness actually increased, presumably as a result of ozonization. Yellowing occurred in all cases after a three-hour exposure to infrared radiation with a 250-watt lamp at a distance of 30 cm., with the following losses in brightness: (I) 5%; (II) 7%; (III) 12%; (IV) 15%; (V) 18%; and (VI) 22-25%. Under conditions leading to pulp solubilization, such as xanthation, (I) showed the lowest insoluble residue (0.2%) and (VI) the highest (>10%), and (II), (III), (IV), and (V) gave residues of 1.4, 3.0, 4.5, and 6%, respectively. Hence, there is an apparent correlation between solubility and yellowing: the higher the solubility, the greater the retention in brightness. A similar relationship appears to exist between pentosan content and yellowing. The six pulps contain 0.6, 1.4, 3.5, 6.2, 11.3, and 25-26% pentosans, respectively. When the pentosans were in part removed with 18% sodium hydroxide from (IV), followed by auxiliary bleaching, the tendency toward yellowing decreased. This was not the case with (VI), which even after such treatment retained 9% pentosans. The possible causes of yellowing are discussed at some length. 4 tables. L.E.W.

Patent Section

Although the abstracts of the United States and Canadian patents are prepared from the patents themselves, the initial selection of the patents to be abstracted is made from the Patent Gazette *and the* Canadian Patent Office Record *and, therefore, it is possible that the patent section will not contain all patents of potential interest to the industry. In so far as possible, an attempt will be made to indicate patents issued in both countries.*

The patent abstracts are listed under the various headings currently used for the abstracts of periodical articles.

Printed copies of United States patents can be obtained from the Commissioner of Patents, Washington, D.C.; the price is 25 cents per copy. Canadian patents up to and including December, 1948, are available only as manuscripts or photostatic copies, and an estimate of the cost of a patent should be obtained from the Commissioner of Patents, Ottawa, Canada, in advance of the order. With January, 1949, printed copies of Canadian patents are available at 25 cents per copy of less than 50 sheets of printed matter. For patents of 50 sheets or over, the price is $1.00 per copy. Beginning with volume 21, the Canadian patents will be abstracted from the complete specifications.

ADVERTISING

HICKOX, LEE. Method and projection display means for evaluating visibility. U. S. patent 2,557,380. Filed April 27, 1949. Issued June 19, 1951. 9 claims. Assigned to Container Laboratories, Inc. [Cl. 88-24; changed to 35-22]

Means are provided for assigning definite mathematical values to the visibility factors of various objects (e.g., competitive packages of merchandise, layouts, or advertising displays). 3 figures. E.G.S.

ALKALINE PROCESSES—RECOVERY

HAMM, ALEXANDER L. Chemical furnace and recovery unit. U. S. patent 2,555,337. Filed April 11, 1945. Issued June 5, 1951. 2 claims. Assigned to Combustion Engineering-Superheater, Inc. [Cl. 23-262]

This corresponds to Canadian patent 446,997; *cf.* B.I.P.C. 18: 564. E.G.S.

BOARD, LAMINATED

CASEBOLT, GEORGE S. Process for laminating paper. U. S. patent 2,554,454. Filed June 22, 1946. Issued May 22, 1951. 2 claims. Assigned to American Cyanamid Company. [Cl. 154-138]

A process of making a waterproof paper laminate (board) comprises the steps of coating paper sheets with a paste of cooked starch and melamine-formaldehyde resin, assembling and cold pressing the sheets together, and curing the assembled laminate under controlled humid conditions in excess of 70% R.H. The starch-resin adhesive is prepared by blending starch, cooked at a pH below 8.6, and melamine-formaldehyde resin in a weight ratio of 5:1 and 20:1, respectively; the pH of the paste is adjusted to 7.3-9.4. E.G.S.

KREYLING, ROBERT L. Manufacture of combined paperboard and silicate-clay adhesives therefor. U. S. patent 2,554,035. Filed Sept. 3, 1946. Issued May 22, 1951. 6 claims. Assigned to Philadelphia Quartz Company. [Cl. 154-33.05]

A clay-silicate adhesive which is suitable for use in the manufacture of combined paperboard comprises a dispersion of about 10-30% by weight of a fine-grained clay in an aqueous phase which contains sodium silicate. The aqueous phase has a viscosity of 1-8 poises at 20°C. and a gravity of 32-50° Bé. Sufficient undissolved and unreacted clay is present to produce a filter test of 0.01-3 ml. and an over-all viscosity of 5-15 poises at 20°C. and about 0.5-5 poises at operating temperatures of 50-85°. The adhesive has the characteristic property of an over-all viscosity which passes through a minimum value of 0.5-5 poises at 50-85° and which rises with increasing temperature after passing through the minimum; a flash set is produced upon the application of the adhesive to a surface preheated to a temperature above the said minimum. 5 figures. E.G.S.

BOARD SPECIALTIES

BUTTERY, KENNETH T. Display cartons. Canadian patent 474,451. Filed Jan. 6, 1949. Issued June 12, 1951. 7 claims. Assigned to Sutherland Paper Company.

This is the same as U. S. patent 2,473,635; *cf.* B.I.P.C. 19: 819. E.G.S.

CURRIE, GROVER C., and BECKER, WALTER A. Bottle carton. U. S. patent 2,556,069. Filed Nov. 28, 1947. Issued June 5, 1951. 1 claim. Assigned to Dacam Corporation. [Cl. 224-45]

A collapsible paperboard bottle carrier incorporates end walls which can be collapsed between the side walls until the carton is ready for use. 4 figures. E.G.S.

GRINNELL, GEORGE G. Foldable tray blanks and trays. Canadian patent 474,120. Filed Dec. 4, 1950. Issued June 5, 1951. 6 claims.

This is the same as U. S. patent 2,532,808; *cf.* B.I.P.C. 21: 361. E.G.S.

HENNESSEY, RUSSELL J. Display carton. U. S. patent 2,554,190. Filed Nov. 29, 1946. Issued May 22, 1951. 12 claims. Assigned to Waldorf Paper Products Company. [Cl. 206-65]

A display carton for canned goods is provided with flaps which engage the recessed ends of the cans at points near the wall of the container. As a result the cans are effectively held against the container wall to prevent their movement within the carton. The carton includes an open side through which the cans may be seen. 5 figures. E.G.S.

ISTWAN, JOSEPH. Serving tray. U. S. patent 2,556,844. Filed April 17, 1950. Issued June 12, 1951. 2 claims. [Cl. 65-53]

A paperboard serving tray embodies apertures for receiving cups and similar containers; detachable sections are associated with each aperture so that the opening can be adjusted to accommodate cups of various size. 3 figures. E.G.S.

LAMBERT, RUSSELL A. Display carton. U. S. patent 2,557,828. Filed Feb. 20, 1950. Issued June 19, 1951. 4 claims. Assigned to Brooks Bank Note Company. [Cl. 206-44; changed to 206-45.11]

A cardboard shipping and display carton may be knocked down for shipment, formed into a tube for purposes of filling, or set up as an easel-type display. 7 figures. E.G.S.

MCRAE, THOMPSON. Appliance for sickrooms and other purposes. U. S. patent 2,557,674. Filed Sept. 20, 1949. Issued June 19, 1951. 3 claims. Assigned 30% to Gaylord R. Hawkins. [Cl. 248-136; changed to 248-150]

A cardboard device is designed to hold a paper bag for the disposal of unused dressings or tissues; means are included for attaching the device to the side of a hospital bed. 2 figures. E.G.S.

MARKOVITZ, VICTOR S. Phonograph disk record package. U. S. patent 2,555,594. Filed Sept. 13, 1948. Issued June 5, 1951. 2 claims. [Cl. 206-62]

A cardboard container for phonograph records may be used as a record album and as a charging device for aligning a number of records on the spindle of a record player. 3 figures. E.G.S.

RINGLER, WILLIAM A. Collapsible carrier with means for maintaining expanded condition. U. S. patent 2,556,778. Filed Feb. 15, 1949. Issued June 12, 1951. 8 claims. Assigned to The Gardner Board and Carton Co. [Cl. 229-28]

A paperboard bottle carrier incorporates means which come into play automatically upon the erection of the carrier to maintain accurately the erected condition of the carrier and thus to facilitate the introduction of the bottles or other articles, either by hand or machine. 14 figures. E.G.S.

RINGLER, WILLIAM A. Collapsible paperboard bottle carrier. U. S. patent 2,556,341. Filed Oct. 16, 1947. Issued June 12, 1951. 4 claims. Assigned to The Gardner Board and Carton Co. [Cl. 229-52]

This is the same as Canadian patent 473,441; *cf.* B.I.P.C. 21: 746. E.G.S.

STAHL, WILLIAM F. Reducing paper tubes in diameter. U. S. patent 2,557,017. Filed Oct. 1, 1945. Issued June 12, 1951. 3 claims. [Cl. 93-1; changed to 93-94]

A method is provided by which a portion of a laminated paper tube may be quickly reduced in diameter and at the same time may remain relatively strong and have a smooth exterior. 6 figures. E.G.S.

SUTTON, JOHN H. Match book. U. S. patent 2,556,561. Filed June 21, 1946. Issued June 12, 1951. 1 claim. [Cl. 206-29]

A match book embodies a split cover, of which only one section need be opened during the withdrawal of a match; a protective shield is also provided, into which the match heads extend when the book is folded. 3 figures. E.G.S.

VICTOR, BERTRAM A. Card holder. U. S. patent 2,557,523. Filed March 22, 1946. Issued June 19, 1951. 1 claim. [Cl. 40-10]

A cardboard card holder incorporates transparent pockets which are designed to receive and protect photographs, identification cards, and the like. 5 figures. E.G.S.

CHLORINE DIOXIDE

HALLER, JOHN F. Analytical methods. Canadian patent 474,429. Filed Nov. 24, 1948. Issued June 12, 1951. 1 claim. Assigned to Mathieson Chemical Corporation.

A method is described for the quantitative analysis of aqueous solutions which contain chlorine as chlorine dioxide or chlorite. A complete analysis is obtained in 20 minutes or less, and the results can be duplicated to within 0.007 p.p.m. of available chlorine with respect to any of the several forms (i.e., free chlorine, chloramine, chlorine dioxide, or chlorite). The method involves four volumetric measurements in each of which a very dilute standard arsenite solution is used as a titrating reagent. E.G.S.

DISPENSING CONTAINERS

GALLAGHER, EDGAR. Cigarette packages. Canadian patent 473,722. Filed Dec. 22, 1949. Issued May 22, 1951. 6 claims.

A slide-and-shell type cigarette package incorporates a cellophane liner which is adhesively attached to the cover flap of the slide element. On closure of the cover flap after the removal of a cigarette, the remaining cigarettes are resealed in the liner by the action of the self-sealing flap. 7 figures. E.G.S.

HOULDSWORTH, WALLACE M. Dispensing container. U. S. patent 2,557,290. Filed July 27, 1946. Issued June 19, 1951. 20 claims. [Cl. 229-7]

A cardboard dispensing container for matches, toothpicks, and the like includes a hopper which is adapted to slide with an open-top box into a cover and to be withdrawn with the box from the cover. 12 figures. E.G.S.

KAFFER, EARL L. Combined container and cover. U. S. patent 2,557,112. Filed Feb. 6, 1947. Issued June 19, 1951. 2 claims. [Cl. 229-43]

A cylindrical cardboard container for the packaging of deodorant powder is provided with a laminated closure which has an outer sealing layer of cellophane assembled over an inner layer of cotton netting or wire cloth. 4 figures. E.G.S.

LUNDBERG, JACOB O. Dispensing containers. Canadian patent 474,332. Filed Jan. 17, 1947. Issued June 12, 1951. 8 claims.

This corresponds to U. S. patent 2,511,442; *cf.* B.I.P.C. 20:827. E.G.S.

PIAZZE, THOMAS E. Dispensing carton. U. S. patent 2,557,839. Filed March 12, 1948. Issued June 19, 1951. 4 claims. Assigned to Shellmar Products Corporation. [Cl. 206-58]

A dispensing carton for a rolled-up commodity (e.g., a seamless, endless polyethylene tube) can be sealed so that it is tamperproof. A cover is pro-

vided which cannot be opened until an aperture is made therein, through which the rolled-up material can be dispensed as desired. 9 figures. E.G.S.

WEBB, LESLIE. Soap dispenser. U. S. patent 2,554,393. Filed Nov. 28, 1947. Issued May 22, 1951. 2 claims. Assigned to The Hunnewell Soap Company. [Cl. 206-0.5]

A cylindrical, paraffin-treated cardboard container is designed to serve as a combined detergent package and dispenser for use in automatic dishwashers and the like. 5 figures. E.G.S.

FOLDING BOXES

BURGER, MARTIN. Cellular carton. U. S. patent 2,554,613. Filed July 28, 1945. Issued May 29, 1951. 14 claims. Assigned to Shellmar Products Corporation. [Cl. 229-28]

A die-cut multicompartment egg carton is designed to offer considerable resistance to crushing pressures. 9 figures. E.G.S.

DENTON, HARVEY R. Liner and receptacle. U. S. patent 2,556,321. Filed June 24, 1946. Issued June 12, 1951. 1 claim. Assigned to Moist-R-Proof Container Co. [Cl. 229-14]

A waterproof liner (e.g., regenerated cellulose or chlorinated rubber) for a cardboard food carton is provided with a collar of semirigid material which is adapted to fold flat with the liner; upon the expansion of the collar the liner is automatically expanded to a position for filling or for insertion into the carton. 5 figures. E.G.S.

DUNNING, ROBERT M. Carton closure. U. S. patent 2,555,581. Filed July 18, 1947. Issued June 5, 1951. 6 claims. Assigned to Waldorf Paper Products Company. [Cl. 229-43]

A glued-end carton is provided with triangular supporting struts which resist outward sealing pressure against the carton end. As a result the innermost flaps do not fold into the carton, and an effective seal is obtained. 4 figures. E.G.S.

GUYER, REYNOLDS. Reinforced carton. U. S. patent 2,556,915. Filed June 19, 1946. Issued June 12, 1951. 1 claim. Assigned to Waldorf Paper Products Company. [Cl. 229-16; changed to 229-37]

A glued-end carton is constructed with two reinforced opposed walls. As a result, considerable stacking strength is imparted to the carton without the addition of thickness to the paperboard from which the carton is formed. 6 figures. E.G.S.

INMAN, WILLIAM H. Collapsible cellular carton. U. S. patent 2,556,088. Filed May 8, 1948. Issued June 5, 1951. 1 claim. Assigned to Bloomer Bros. Company. [Cl. 229-28]

A collapsible, cellular cardboard carton is adapted for the packaging of eggs, fruit, cakes, and other fragile articles. 6 figures. E.G.S.

MICHETTI, LOUIS C. Foldable box. U. S. patent 2,554,677. Filed Aug. 16, 1947. Issued May 29, 1951. 1 claim. Assigned to Noble

Andre, doing business as Andre Paper Box Company. [Cl. 229-35]

A folding box of the snap-open type requires only one point of presecurement of the parts of the blank which form the box. 6 figures. E.G.S.

MILLER, OTTO M. Folding carton and opening flap therefor. U. S. patent 2,557,914. Filed Jan. 8, 1948. Issued June 19, 1951. 12 claims. Assigned to Owens-Illinois Glass Company. [Cl. 229-51]

A folding carton is provided with a pull-up or opening flap which, when pulled up, will effect a clean break of the seal or holding means for the cover, without sacrificing strength at the point of closure and without tearing any glued fiber from the area of the carton overlying the contents of the package. 11 figures. E.G.S.

PAINTER, CLAUDE D. Folding box. U. S. patent 2,555,655. Filed Nov. 19, 1945. Issued June 5, 1951. 4 claims. [Cl. 229-32]

A folding box is erected or opened from a flat folded form by the application of a slight pressure to the opposite ends of the flat form. 21 figures. E.G.S.

SALERNO, GEORGE F. Packaged food products and packaging methods. Canadian patent 473,742. Filed Sept. 2, 1949. Issued May 22, 1951. 4 claims.

This is the same as U. S. patent 2,489,726; *cf.* B.I.P.C. 20:365. E.G.S.

SAMSING, ROLF A. Box blank and box. U. S. patent 2,553,870. Filed June 29, 1950. Issued May 22, 1951. 3 claims. Assigned to Associated Folding Box Co. [Cl. 229-35]

A one-piece box blank includes an end-wall panel at each end of the bottom wall which is slotted to receive co-operating side-wall flaps. Each such flap carries an outwardly projecting locking tab which is adapted to bend at a right angle with the free end of the end-wall panel and thus to anchor the flaps to the end panel. 4 figures. E.G.S.

VINEBERG, JOSEPH H. Collapsible box. U. S. patent 2,555,719. Filed April 17, 1946. Issued June 5, 1951. 7 claims. [Cl. 206-7]

A one-piece garment-carrying box is provided with a handle and hanger and is of sufficient depth to accommodate any garment for which the box may be used. 4 figures. E.G.S.

ZINN, JULIUS A., JR. Methods of assembling containers. Canadian patent 473,950. Filed July 8, 1949. Issued May 29, 1951. 8 claims.

This is the same as U. S. patent 2,480,176; *cf.* B.I.P.C. 20:140. E.G.S.

ZINN, JULIUS A., JR. Pour seal structure for cartons. U. S. patent 2,555,526. Filed July 15, 1948. Issued June 5, 1951. 9 claims. [Cl. 229-17]

A liquidtight paperboard container incorporates a pour seal structure which includes a bellows-type top closure. The alignment of the inner and outer plies of the structure during the top-closing operation is assured. 10 figures. E.G.S.

FOLDING BOXES, SIFTPROOF

GUYER, REYNOLDS. Methods of making leak proof packages. Canadian patent 473,861. Filed July 17, 1946. Issued May 22, 1951. 8 claims. Assigned to Waldorf Paper Products Company.

A waxed cardboard carton is rendered leak- and siftproof by the application of pressure inwardly to the corners of the carton to press the apex of the corner toward the interior and to compact the fibrous structure at the corner. 18 figures. E.G.S.

ZINN, JULIUS A., JR. Carton. U. S. patent 2,553,803. Filed March 25, 1947. Issued May 22, 1951. 7 claims. [Cl. 229-43; changed to 229-37]

A siftproof carton is designed to resist crushing during the sealing operation. 7 figures. E.G.S.

ZINN, JULIUS A., JR. Carton having end closures of substantially uniform thickness. U. S. patent 2,553,804. Filed March 28, 1947. Issued May 22, 1951. 8 claims. [Cl. 229-37]

A siftproof carton which is provided with end closures of substantially uniform thickness is adapted to be sealed without being crushed. 11 figures. E.G.S.

INTERIOR PACKING

ROSELIUS, LOUIS W. Partitions for containers. Canadian patent 474,275. Filed May 25, 1948. Issued June 5, 1951. 1 claim. Assigned to S&S Corrugated Paper Machinery Co., Inc.

This corresponds to U. S. patent 2,464,154; *cf.* B.I.P.C. 19:597. E.G.S.

MACHINERY—CONVERTING MACHINERY

ACKER, RALPH E. Machine for setting up corner locking trays. U. S. patent 2,553,733. Filed Feb. 20, 1948. Issued May 22, 1951. 8 claims. Assigned to Container Corporation of America. [Cl. 93-51]

An apparatus is provided for the setting up of corner-locking containers or trays from blanks by the movement of a plunger into a throat; the plunger acts on a bottom panel and moves it through the throat while the locking tabs and end flaps are moved into locking engagement as the side and end walls are set up. 7 figures. E.G.S.

AHLMEYER, HEINZ, and SHERMAN, WHITNEY D. Carton folding apparatus and methods. Canadian patent 474,207. Filed Aug. 5, 1948. Issued June 5, 1951. 22 claims. Assigned to Robert Gair Company, Inc.

A carton-folding machine is adapted for the manufacture of cardboard bottle carriers; a complete folding operation is accomplished in four principal steps. 17 figures. E.G.S.

BERGSTEIN, SAMUEL. Machine for covering knocked down cartons. U. S. patent 2,553,740. Filed Aug. 31, 1946. Issued May 22, 1951. 16 claims. [Cl. 93-54]

A machine is described which operates to wrap the tubular body of a paperboard window carton in a cellophane sleevelike member and then to adhere the sleeve uniformly to the walls of the carton throughout their area. 16 figures. E.G.S.

BERGSTEIN, SAMUEL. Mechanism and method for making boxes with attached handles and the like. U. S. patent 2,554,004. Filed May 18, 1944. Issued May 22, 1951. 36 claims. [Cl. 93-39]

This is similar to Canadian patent 464,561; *cf.* B.I.P.C. 20:683. E.G.S.

HOLLIS, ROBERT F. Apparatus for laminating materials. U. S. patent 2,554,988. Filed Dec. 23, 1946. Issued May 29, 1951. 4 claims. Assigned to Alton Box Board Company. [Cl. 154-1]

After suitable pretreatment, sheets of paper which are to be laminated together are fed into a continuous press which comprises a pair of endless bands having adjacent reaches sufficiently spaced from each other to admit the material to be laminated therebetween. 4 figures. E.G.S.

HOLMES, RAYMOND D. Cutout clearer for perforated containers. U. S. patent 2,557,504. Filed April 17, 1950. Issued June 19, 1951. 4 claims. Assigned to Fleming Specialty Company. [Cl. 164-91; changed to 93-36]

An apparatus is provided for punching previously cut portions from cardboard containers, such as chick cartons and the like. 5 figures. E.G.S.

KAEHLER, ARNOLD A., and JOHNSON, ENOCH B. Box forming machine. U. S. patent 2,554,574. Filed Aug. 4, 1945. Issued May 29, 1951. 13 claims. [Cl. 93-44; changed to 93-36.4]

A carton-closing and sealing machine is adapted to apply adhesive to the end flaps of a carton, to fold the flaps upon one another, and to crease the side flaps in order to adhere them together more effectively during the preliminary drying of the adhesive. Means are provided for the application of pressure from within the container outwardly, against the folded, adhered flaps, as well as downwardly against the exterior of the outermost flap. 7 figures. E.G.S.

ZINN, JULIUS A., JR. Forming machines. Canadian patent 473,949. Filed July 8, 1949. Issued May 29, 1951. 27 claims.

A fluid pressure-operated carton-forming machine is adapted to perform folding or bending operations on a flat box blank. The fluid pressure-supply systems are contained in the base of the machine and are arranged to deliver fluid under pressure through passages and ports in a central, fixed, cylindrical column. The various forming assemblies rotate about the central column, and each is provided with ports which co-act with the column ports and with passages or piping which conducts the fluid to the actuating mechanisms (i.e., motors and motor cylinders) for the various moving elements. The use of fluid pressure on the moving elements permits a positive pressure on the unit which is being formed, regardless of the variation in thickness or compressibility of the material. Thus the complete adhesion of seams without the formation of air bells or pockets is ensured. 50 figures. E.G.S.

ZINN, JULIUS A., JR., and WILSON, MICHAEL J. Carton forming machines. Canadian patent 474,300. Filed July 8, 1949. Issued June 5, 1951. 13 claims. Wilson's interest assigned to Zinn.

This is the same as U. S. patent 2,480,177; *cf.* B.I.P.C. 20:142. E.G.S.

MACHINERY—CORRUGATING MACHINE

SHIELDS, ALBERT F. Corrugating roll lubricator. U. S. patent 2,557,011. Filed March 17, 1948. Issued June 12, 1951. 3 claims. Assigned to S&S Corrugated Paper Machinery Co., Inc. [Cl. 154-30]

A corrugating-roll lubricator is adapted for use in conjunction with a single facer, but it may be utilized in a double facer for lubricating the second outer liner which is applied to the face of the corrugated web. Means are provided for atomizing and spraying the lubricant (e.g., paraffin) onto the corrugating roll. 3 figures. E.G.S.

MACHINERY—DRYERS

HORNBOSTEL, LLOYD. Head and shell joints for drier drums. Canadian patent 474,369. Filed Oct. 23, 1946. Issued June 12, 1951. 8 claims. Assigned to Beloit Iron Works.

A bridging clamp arrangement is provided for locking the heads of a drier drum to the shell without perforating the latter. 4 figures. E.G.S.

MACHINERY—FELTS

KOESTER, JOHN P., and COMER, HAROLD S. Papermaker's felt. U. S. patent 2,554,034. Filed Aug. 18, 1948. Issued May 22, 1951. 2 claims. Assigned to The Orr Felt & Blanket Company. [Cl. 139-426]

A papermaker's felt is described in which the warp system of the woven felt is a cotton yarn, and the filling system consists of a cotton yarn and a wool yarn which are laid in a regular repeating pattern. 18 figures. E.G.S.

MACHINERY—FILTERS

CHASE, CHARLES B. Filter element. U. S. patent 2,556,521. Filed Nov. 14, 1946. Issued June 12, 1951. 1 claim. Assigned to Fram Corporation. [Cl. 210-169]

A replaceable paper cartridge for an oil filter is constructed in such a manner that it has a relatively large capacity for the collection of contaminant. 16 figures. E.G.S.

GUNN, EARL G. Filter element. U. S. patent 2,553,820. Filed April 23, 1948. Issued May 22, 1951. 2 claims. Assigned to Fram Corporation. [Cl. 210-169]

A cross-flow paper filter for lubricating or fuel oil is designed for a relatively high flow rate and for the removal of small particles. The filter element comprises an assembly of layers of paper which is sealed at the desired locations by pressure upon the entire stack. 8 figures. E.G.S.

MACHINERY—FOLDING MACHINE

HESS, CHARLES. Folding machines. Canadian patent 473,841. Filed July 3, 1948. Issued May 22, 1951. 2 claims. Assigned to S&S Corrugated Paper Machinery Co., Inc.

A corrugated box-folding machine includes a pair of deflecting bars which co-operate with folding slats to deflect the side panels of a box upwardly as the box blank is moved through the machine. 3 figures. E.G.S.

MACHINERY—PACKAGING MACHINERY

NOBLE, FRANK W., and BAKER, DONALD C. Wrapping machine. U. S. patent 2,555,758. Filed May 4, 1948. Issued June 5, 1951. 7 claims. Assigned to The Robinson Waxed Paper Company, Limited. [Cl. 93-3]

A wrapping machine includes means for forming a paper web longitudinally into a tube and for sealing a number of disk-shaped articles (e.g., biscuits) within the tube. 16 figures. E.G.S.

SALFISBERG, LEROY L. Package crimping machines. Canadian patent 473,820. Filed Dec. 20, 1949. Issued May 22, 1951. 6 claims. Assigned to Ivers-Lee Company.

This is the same as U. S. patent 2,500,874; *cf.* B.I.P.C. 20:612. E.G.S.

MACHINERY—PASTING MACHINE

SHIELDS, ALBERT F. Taping machine tape supply controls. Canadian patent 473,842. Filed Nov. 15, 1949. Issued May 22, 1951. 9 claims. Assigned to S&S Corrugated Paper Machinery Co., Inc.

A carton-taping machine includes a dual tape supply roll which is provided with means for maintaining a continuous tape supply, despite the fact that the original supply roll may be exhausted during a run. 3 figures. E.G.S.

MACHINERY—PULPERS

COWLES, EDWIN. Apparatus for pulping paper stock. U. S. patent 2,557,174. Filed Jan. 26, 1949. Issued June 19, 1951. 10 claims. Assigned to The Cowles Company. [Cl. 92-26]

A pulper embodies an impeller and tank which are so constructed and arranged as to make it possible for a small impeller to create and maintain adequate circulation of all portions of the stock in the tank, but without the necessity of maintaining vortical circulation of all portions of the stock. 9 figures. E.G.S.

MACHINERY—SAWS

JOHNSON, ALFRED J., and MCCORMACK, FOSTER D. Pulpwood chain sawing machine. U. S. patent 2,554,989. Filed April 24, 1948. Issued May 29, 1951. 7 claims. [Cl. 143-32]

A pulpwood chain sawing machine includes a hydraulically actuated device for lifting a log and holding it firmly against a chain saw during the sawing operation. 6 figures. E.G.S.

MACHINERY—SLITTERS AND WINDERS

HASWELL, HENRY L. Slitting device. U. S. patent 2,554,027. Filed July 23, 1946. Issued May 22, 1951. 3 claims. Assigned to Ecusta Paper Corporation. [Cl. 164-60; changed to 164-70]

A slitting device which is adapted for use in conjunction with a winder incorporates circular shear elements and relatively flexible cutting knives which are associated for rotation in overlapping relation under sidewise pressure. 6 figures. E.G.S.

MACHINERY—SUCTION ROLLS

HORNBOSTEL, LLOYD. Suction roll seal assemblies. Canadian patent 473,975. Filed June 20, 1949. Issued May 29, 1951. 10 claims. Assigned to Beloit Iron Works.

A suction roll seal assembly is adapted for the effective sealing of a sealing strip within its associated gland housing despite the eccentricity of the suction roll shell and the suction roll gland. 4 figures. E.G.S.

PACKAGING

REBORA, STEPHEN F. Cosmetic package. U. S. patent 2,557,141. Filed Jan. 8, 1945. Issued June 19, 1951. 7 claims. Assigned to Jacque C. Morrell. [Cl. 206-46; changed to 206-47]

A combination paperboard cosmetic package is adapted for the holding and application of rouge, powder, lipstick, or the like. 11 figures. E.G.S.

STUART, KIMBERLY, and WILSON, ALLEN B. Container. U. S. patent 2,555,380. Filed Jan. 21, 1946. Issued June 5, 1951. 5 claims. Wilson's interest assigned to Elizabeth R. B. Stuart. [Cl. 229-3.5]

A spirally wound tubular container which is designed for the packaging of food mixtures and liquids (e.g., beer) incorporates a substantially continuous metal foil lining. The lining is preferably sealed with a special latex adhesive which is chemically inert to the contents of the carton. 19 figures. E.G.S.

WICKERSHAM, FREDERICK O. Paper container for pastries. U. S. patent 2,556,638. Filed Nov. 3, 1947. Issued June 12, 1951. 6 claims. [Cl. 206-1; changed to 206-45.17]

A paper container for the packaging of mushroom-shaped pastry is designed to permit the inspection of the pastry without its removal from the carton. 4 figures. E.G.S.

PAPER—COATED

BRADNER, DONALD B. Method of printing and coating paper. U. S. patent 2,555,266. Filed July 10, 1945. Issued May 29, 1951. 19 claims. Assigned to The Champion Paper and Fibre Company. [Cl. 101-426]

A process is described for the treatment of paper to provide in a single operation a printed, coated, cast-surface sheet which is suitable for use as labels for cans, bottles, or other containers. 1 figure. E.G.S.

COWGILL, WILLIAM W. Grease-proof paper and process of mak-

ing the same. U. S. patent 2,554,899. Filed Dec. 20, 1949. Issued May 29, 1951. 4 claims. Assigned to United States Rubber Company. [Cl. 117-76]

A process is described for the grease- and waterproofing of paper. As an example, a paperboard is coated with a mixture of an aqueous dispersion of a resinous copolymer of 17.5% butadiene and 82.5% styrene and an aqueous dispersion of a rubbery copolymer of butadiene and styrene which contains approximately 54% bound butadiene and 46% bound styrene. The dispersion is coated onto the paperboard at such a rate that about 0.3 lb. of copolymer is applied per 1000 sq. ft. of surface. The coated board is then dried to remove the water. There is then applied over the dried first coating a second coating of a composition which comprises a mixture of an aqueous dispersion of a resinous styrene-acrylonitrile (70:30) copolymer and an aqueous dispersion of a rubbery butadiene-acrylonitrile (65:35) copolymer. About 1.6 lb. of the two copolymers are applied per 1000 sq. ft. of surface. Upon the removal of water from the second coating by drying, a paper product is obtained which is grease- and water-resistant. E.G.S.

COWGILL, WILLIAM W. Process of glossing paper. U. S. patent 2,554,662. Filed Aug. 16, 1947. Issued May 29, 1951. 2 claims. Assigned to United States Rubber Company. [Cl. 117-65]

A method for the glossing of paper comprises the steps of applying to the surface of the paper a coating of an aqueous dispersion of an amorphous thermoplastic polymer (e.g., styrene-acrylonitrile or styrene-butadiene copolymer) which has a second-order transition temperature (I) of 40-125°C.; drying the coated paper at a temperature which is 20-60° higher than the (I) of the polymer employed; pressing the dried, coated surface of the paper against a heated surface at a temperature which is 40-80° higher than (I), so that the polymer on the surface of the paper is converted to a thin, continuous, strongly adherent, highly glossed coating; and stripping the hot glossed product from the heated surface. 1 figure. E.G.S.

FAEBER, HARRY W. Method of coating paper. U. S. patent 2,556,262. Filed Nov. 16, 1946. Issued June 12, 1951. 3 claims. Assigned to Time, Inc. [Cl. 117-111]

The coating composition on the transfer rolls of a roll-coating machine is maintained at the dew point of the surrounding atmosphere by the internal cooling of at least one of the rolls with circulating water. The same effect is obtained by the addition of moisture to the atmosphere. 1 figure. E.G.S.

FAEBER, HARRY W. Roller coating machine. U. S. patent 2,556,032. Filed Oct. 6, 1947. Issued June 5, 1951. 19 claims. Assigned to Time, Inc. [Cl. 91-50]

A roll-coating machine is provided with an improved quick-release mechanism for interrupting the coating process when the paper web breaks. 17 figures. E.G.S.

FRIES, KARL W. Coating compositions. Canadian patent 473,838. Filed Nov. 19, 1945. Issued May 22, 1951. 3 claims. Assigned to Rhinelander Paper Company.

This is the same as U. S. patent 2,469,108; *cf.* B.I.P.C. 19:745. E.G.S.

PAPER SPECIALTIES

BOCK, LOUIS H. Modification of cellulose by boron trifluoride solution. U. S. patent 2,554,439. Filed April 22, 1948. Issued May 22, 1951. 7 claims. Assigned to Rohm & Haas Company. [Cl. 8-116]

A process of parchmentizing a paper sheet comprises the treatment of the sheet with a 58-67% aqueous boron trifluoride solution at −5 to 30°C.; continuation of the treatment until translucent, parchmentlike properties are observed in the sheet; and the subsequent removal of boron trifluoride from the sheet. E.G.S.

BRAND, MAURICE B. Denture liner of bibulous paper impregnated with vinyl resin. U. S. patent 2,557,025. Filed Sept. 9, 1949. Issued June 12, 1951. 6 claims. [Cl. 260-31.8]

A denture liner consists of thin bibulous paper (e.g., yoshino paper) impregnated with the following composition: 100 parts of a vinyl chloride-vinyl acetate (87:13) resin with an intrinsic viscosity of about 0.24; about 20 parts of vinyl acetate resin with an intrinsic viscosity of about 0.39; about 10 parts of vinyl acetate resin with an intrinsic viscosity of about 0.11; about 3 parts of benzoyl peroxide; and about 16 parts of dibutyl phthalate (all on weight basis). E.G.S.

CARROLL, JOSEPH P. Method of producing containers. U. S. patent 2,555,315. Filed July 5, 1945. Issued June 5, 1951. 2 claims. Assigned to American Can Company. [Cl. 93-36]

This corresponds to Canadian patent 447,669; *cf.* B.I.P.C. 18:646. E.G.S.

COOK, WAYNE S. Packing cord, beading cord, edge roll, or the like. U. S. patent 2,557,343. Filed Aug. 19, 1948. Issued June 19, 1951. 6 claims. Assigned to Sackner Products, Inc. [Cl. 87-1]

A packing cord, beading cord, edge roll, or the like has a relatively high tensile strength, uniform dimensions, and a smooth exterior. The cord comprises a cylindrical body which is formed of compressed, crumpled strips of creped tissue and which is enclosed in a braided jacket of wax-coated glass fibers. 4 figures. E.G.S.

CRAIG, KENNETH A., and AUCHTER, RICHARD J. Panel facings. Canadian patent 474,245. Filed Oct. 9, 1946. Issued June 5, 1951. 4 claims. Assigned to Paper Patents Company.

This is the same as U. S. patent 2,448,357; *cf.* B.I.P.C. 19:135. E.G.S.

DALTON, HAROLD R. Electroresponsive recording blank. U. S. patent 2,554,017. Filed Nov. 14, 1946. Issued May 22, 1951. 7 claims. Assigned to Timefax Corporation. [Cl. 117-33.5]

A facsimile recording blank incorporates a surface coating which is adapted to be removed in localized areas in response to applied electric signals; the coating contains a pigment material which includes 10-100% of a luminescent or phosphorescent substance. 3 figures. E.G.S.

DALTON, HAROLD R., and COOLEY, AUSTIN G. Facsimile record-

ing paper. U. S. patent 2,555,321. Filed Aug. 8, 1941. Issued June 5, 1951. 8 claims. Assigned to The Western Union Telegraph Company. [Cl. 204-2]

A facsimile recording paper comprises a paper base (e.g., writing, bond, or book paper), a thin conducting layer of gas black and a suitable binder (e.g., Methocel) and an overlying white facsimile coating which contains zinc oxide. 1 figure. E.G.S.

DE ROUVILLE, EDWARD M. Carry bag. U. S. patent 2,555,844. Filed June 26, 1947. Issued June 5, 1951. 4 claims. Assigned to United States Envelope Company. [Cl. 229-52; changed to 229-54]

The extensions of the walls of a paper carry bag serve to form a hand grip. Hand grip reinforcements are adhesively attached near the mouth of the bag. 8 figures. E.G.S.

EVANS, DAVID C. Holder for spun sugar candy. U. S. patent 2,553,757. Filed Feb. 28, 1949. Issued May 22, 1951. 3 claims. [Cl. 99-138]

A paper dispensing receptacle or holder for spun sugar candy includes an upper lip which is so configurated that it readily picks up a quantity of candy from a mass of the substance during a dispensing operation. 6 figures. E.G.S.

HARRIS, EULA E. Special package for frozen uncooked pie crusts. U. S. patent 2,555,033. Filed May 6, 1949. Issued May 29, 1951. 2 claims. [Cl. 99-172]

A paper package is designed to keep a fragile frozen disk of pie crust dough from becoming bent or broken and to protect it from the dehumidifying effects incident to its storage in a freezing chamber. 6 figures. E.G.S.

JONES, HILTON I. Dusting and polishing paper. Canadian patent 474,235. Filed Jan. 5, 1950. Issued June 5, 1951. 17 claims. Assigned to The Munising Paper Company.

This is the same as U. S. patent 2,495,066; *cf.* B.I.P.C. 20:457. E.G.S.

KELLGREN, WALDO, and CHARPENTIER, JESSE J. Liners for adherent rubber surfaces and the like. Canadian patent 474,037. Filed Aug. 28, 1946. Issued May 29, 1951. 6 claims. Assigned to Minnesota Mining & Manufacturing Company.

This is the same as U. S. patent 2,496,349; *cf.* B.I.P.C. 20:538-9. E.G.S.

LAMBERT, RALPH E. Wrapping paper comprising single face corrugated board and integral fly webs. U. S. patent 2,553,923. Filed Sept. 11, 1948. Issued May 22, 1951. 4 claims. [Cl. 206-59]

A roll of wrapping paper comprises single-face corrugated board and integral fly webs. The free margins of the fly web are folded back on the composite material so that the margins of the web neither project from the corrugated board in the roll, nor are they folded onto the face of the board. For use, the direction of fold of the fly-web margins is reversed from the position in which the margins are folded in the roll. 4 figures. E.G.S.

MATTHIESEN, GEORGE H. Clasp-type closure for envelopes. U. S. patent 2,555,983. Filed June 4, 1947. Issued June 5, 1951. 4 claims. [Cl. 229-77; changed to 229-78]

A clasp-type closure for a conventional envelope is provided, and a method of stuffing and closing such an envelope is described. 10 figures. E.G.S.

TOWNE, HAROLD G. Dispensing packages of flexible articles of sheet material. Canadian patent 474,193. Filed Feb. 3, 1949. Issued June 5, 1951. 12 claims. Assigned to Dennison Manufacturing Company.

This corresponds to U. S. patent 2,540,499; *cf.* B.I.P.C. 21:521-2. E.G.S.

PLASTICS—PAPER-BASE

POWERS, DONALD H. Bonded laminae and method of making same. U. S. patent 2,555,506. Filed July 8, 1947. Issued June 5, 1951. 17 claims. Assigned to Monsanto Chemical Company. [Cl. 154-138]

A method of forming a paper laminate comprises the steps of impregnating paper sheets with a colloidal solution of silica; drying the sheets; impregnating the dried sheets with a liquid resin consisting of styrene copolymerized with an ethylene glycol-maleic anhydride condensation product; and bonding the impregnated sheets by the application of heat and a small amount of pressure. E.G.S.

SWAYZE, DONALD L., and NICHOLLS, AUGUSTUS H. Method of making a cellular structural panel and product. U. S. patent 2,556,011. Filed May 5, 1947. Issued June 5, 1951. 3 claims. Assigned to Chrysler Corporation. [Cl. 154-33.05]

A structural panel comprises a facing skin of a high-strength, lightweight material (e.g., plywood, aluminum, steel, metal alloys, cardboard, or the like) and an intermediate cellular structure which is formed from a single continuous sheet of reversely convoluted, phenolic resin-impregnated paper. 6 figures. E.G.S.

ROOFING FELTS

FASOLD, GEORGE A., and GREIDER, HAROLD W. Roofing and the manufacture thereof. U. S. patent 2,555,401. Filed Dec. 28, 1944. Issued June 5, 1951. 20 claims. Assigned to The Philip Carey Manufacturing Company. [Cl. 117-92]

A water-resistant roofing felt which incorporates relatively long mineral fibers (e.g., glass fibers) in the base sheet is impregnated with a bituminous saturant with a softening point of about 190°F. and is coated with a weather-resistant layer of bituminous material (e.g., roofing asphalt) with a softening point of about 205°. 17 figures. E.G.S.

SHIPPING CONTAINERS

AIKMAN, HARRY S. Container. U. S. patent 2,556,568. Filed Nov. 9, 1946. Issued June 12, 1951. 3 claims. [Cl. 229-23; changed to 229-6]

A shipping container is provided which can be converted into a baking pan of proper size and which is so constructed that the proportion and size of the pan can be adjusted as desired. The package enclosed by the container consists of a dry prepared mixture which contains activated yeast; the mixtures are adapted for the baking of yeast-raised bread, rolls, buns, coffee cakes, pastry, and the like. 14 figures. E.G.S.

ANDRE, MICHAEL C. Bendable clip box lock. U. S. patent 2,553,840. Filed April 12, 1950. Issued May 22, 1951. 3 claims. Assigned to Gaylord Container Corporation. [Cl. 229-45; changed to 229-47]

A flat, pliable metal clip fastener for a paperboard box is formed into a pair of superimposed leg portions of unequal length, so that after the shorter leg has been inserted into position, the longer leg may be bent against the cover of the box to hold the box members locked. 6 figures. E.G.S.

DAHLE, ALBERT B. Wire coil container. U. S. patent 2,554,615. Filed Oct. 28, 1946. Issued May 29, 1951. 7 claims. [Cl. 242-146]

A fiberboard shipping container for a coil of insulated wire includes means for dispensing wire from the coil as needed and for rewinding excess wire pulled from the coil without opening the container. 5 figures. E.G.S.

FARRELL, JAMES A. Shipping carton for glass. U. S. patent 2,556,529. Filed July 9, 1948. Issued June 12, 1951. 2 claims. Assigned to Cadillac Products, Inc. [Cl. 206-62]

A fiberboard shipping container for glass sheets includes an outer protective carton and corner-engaging cushioning pads which are adapted to support the glass panes in the carton in spaced relationship to the carton walls. 5 figures. E.G.S.

RENDALL, WARREN C., and RUSHING, FRED L. Convertible shipping carton and self-feeder. U. S. patent 2,556,661. Filed Jan. 10, 1949. Issued June 12, 1951. 5 claims. Assigned to Gaylord Container Corporation. [Cl. 229-7]

A shipping carton for poultry feed is adapted for conversion to a trough-type self-feeder. 12 figures. E.G.S.

RENDALL, WARREN C., and RUSHING, FRED L. Convertible shipping carton and self-feeder. U. S. patent 2,556,707. Filed Dec. 31, 1948. Issued June 12, 1951. 4 claims. Assigned to Gaylord Container Corporation. [Cl. 229-7]

A shipping container for poultry feed incorporates a folded self-feeding insert which is snugly held inside the sealed carton during shipment and which has a hinged trough-forming portion adapted to be swung outwardly into operative position through a slit in the wall of the carton. 8 figures. E.G.S.

SHIPPING CONTAINERS—FIBER DRUMS

O'NEIL, JOHN G. Container with sealing lid. U. S. patent 2,555,700. Filed April 8, 1946. Issued June 5, 1951. 1 claim. Assigned to O'Neil-Weinhagen. [Cl. 229-5.5]

A cylindrical paper container for food products is provided with a tight-fitting lid which serves to seal the carton. 4 figures. E.G.S.

SIMMONS, NICHOLAS L. Package for whey concentrate and other dairy products. U. S. patent 2,557,576. Filed Jan. 14, 1949. Issued June 19, 1951. 2 claims. [Cl. 99-171; changed to 99-181]

A spirally wound cardboard container for the packaging of whey concentrate and other dairy products incorporates a polyethylene liner bag which is designed to protect the container from the lactic acid in the packaged product. 6 figures. E.G.S.

WATERS, HARRY F. Method of forming cylindrical containers. U. S. patent 2,554,722. Filed June 10, 1949. Issued May 29, 1951. 4 claims. [Cl. 154-83]

A method is described for the formation of a cylindrical paper container having a multi-ply wall which embodies one fluted ply and inner and outer liners. Air pressure is utilized to force the fluted ply against the outer liner until the two plies are adhesively joined. 12 figures. E.G.S.

SHIPPING CONTAINERS—MULTIWALL BAGS

FOX, MARY C., and HOWES, CHARLES C. Container. U. S. patent 2,555,031. Filed July 10, 1946. Issued May 29, 1951. 2 claims. Assigned to The Davison Chemical Corporation. [Cl. 206-2]

A multilayer kraft paper bag is adapted for the packaging of superphosphate fertilizers. A strongly adherent coating of a homogeneous mixture of lime and starch is applied to the inner surface of the innermost layer of the bag; the starch serves to bond the coating to the paper and extends through the lime to provide a continuous protective layer which is adapted to intercept and neutralize materials destructive to the paper prior to contact with the paper. 3 figures. E.G.S.

WEEKS, NORMAN E. Valved bags. Canadian patent 474,168. Filed July 29, 1948. Issued June 5, 1951. 2 claims. Assigned to Bemis Bro. Bag Company.

This is the same as U. S. patent 2,517,068; *cf.* B.I.P.C. 21:71. E.G.S.

SULFITE WASTE LIQUOR

HOLZER, TIBOR. Processes for the manufacture of molded articles. Canadian patent 474,325. Filed Oct. 5, 1946. Issued June 12, 1951. 10 claims.

This is the same as U. S. patent 2,534,908; *cf.* B.I.P.C. 21:373. E.G.S.

MOSER, FRANZ R. Process for the manufacture of a novel binding agent for core sand from sulfite lye. U. S. patent 2,556,333. Filed Feb. 11, 1948. Issued June 12, 1951. 6 claims. Assigned to Oel- und Chemie-Werk A. G. [Cl. 22-188]

A process for the production of foundry cores comprises the steps of adding sulfuric acid to spent sulfite liquor in excess of the amount required to neutralize the basic constituents of the liquor; heating the mixture until a marked increase in viscosity is produced; mixing the resulting mixture with sand; and forming and baking the core at 150-250°C. E.G.S.

MOSER, FRANZ R. Process for the manufacture of a novel binding agent for core sand from sulfite lye. U. S. patent 2,556,334. Filed Feb. 11, 1948. Issued June 12, 1951. 8 claims. Assigned to Oel- und Chemie-Werk A. G. [Cl. 22-188]

This is similar to Canadian patent 440,792; *cf.* B.I.P.C. 17:540. E.G.S.

SIMPSON, HERMAN N. Apparatus for recovering chemicals from liquor produced by pulping of cellulosic materials. Canadian patent 474,142. Filed June 3, 1947. Issued June 5, 1951. 15 claims.

This corresponds to U. S. patent 2,542,060; *cf.* B.I.P.C. 21:524. E.G.S.

TALL OIL

DAVIS, JAMES W., and SPURLIN, HAROLD M. Tall oil separation process. U. S. patent 2,558,543. Filed Oct. 18, 1949. Issued June 26, 1951. 14 claims. Assigned to Hercules Powder Company. [Cl. 260-97.6]

A countercurrent extraction process is adapted for the separation of the resin and fatty acids in tall oil. Black liquor skimmings, tall oil, or the like is introduced at an intermediate point in a vertical extraction column; at the same time, an aqueous solution of sodium hydroxide and isopropanol is fed to the top of the column, and gasoline is pumped into the bottom. The resin acids, neutral material, and gasoline are removed as the light fraction from the top of the column, and the fatty acid soaps in an aqueous isopropanol solution are drawn from the bottom. 2 figures. E.G.S.

HENKES, RUDOLF A. Well-drilling fluid. U. S. patent 2,555,794. Filed Oct. 18, 1948. Issued June 5, 1951. 4 claims. Assigned to Shell Development Company. [Cl. 252-8.5]

A drilling emulsion for oil and gas wells comprises approximately 50-85% of an aqueous fluid which forms the external phase of the emulsion, 15-50% of a mineral oil which forms the internal phase of the emulsion, a finely divided solid material dispersed in the emulsion, an emulsifying agent (e.g., 4-8% of tall oil, based on the volume of mineral oil), and a quantity of a basic substance equivalent to approximately 2-4% of a 40° Bé. aqueous sodium hydroxide solution. The basic substance should be capable of forming a water-soluble soap with tall oil. E.G.S.

MOYER, SAMUEL P. Flotation of ilmenite ores. U. S. patent 2,557,455. Filed March 12, 1948. Issued June 19, 1951. 1 claim. Assigned to American Cyanamid Company. [Cl. 209-166]

Tall oil (2.5 lb./ton of ore) is used as an anionic promoter in the separation by froth flotation of titanium oxide minerals from low-grade ores which contain excessive amounts of phosphate-bearing minerals (e.g., apatite, ilmenite, or nelsonite). E.G.S.

VANILLIN

FORTESS, FRED, and WHITE, BLANCHE B. Fusion of vanillin. U. S. patent 2,547,920. Filed June 29, 1949. Issued April 10, 1951. 1 claim. Assigned to Celanese Corporation of America. [Cl. 260-521]

A process for the fusion of vanillin to produce vanillic and protocatechuic acids comprises the steps of forming a melt of 80 parts of sodium hydroxide and 50 parts of water, adding 50 parts of vanillin to the melt while maintaining the latter at a temperature below 81°C., and raising the temperature of the melt to 205-240° for 90 minutes. Compositions are expressed on a weight basis. E.G.S.

WET STRENGTH

BROOKES, ALFRED, and HUDSON, FREDERICK L. Urea-formaldehyde-sulphoxylate resin for high wet-strength paper. U. S. patent 2,556,898. Filed Dec. 16, 1946. Issued June 12, 1951. 12 claims. Assigned to American Cyanamid Company. [Cl. 92-21]

A high-wet strength paper is beater sized with 0.25-25% by weight of a water-soluble sulfoxylated condensation product of urea and formaldehyde (1 mole of urea to 1.5-3 moles of formaldehyde). E.G.S.

SUEN, TZENG-JIEUQ. Acid-resistant wet strength paper. Canadian patent 473,753. Filed June 20, 1949. Issued May 22, 1951. 8 claims. Assigned to American Cyanamid Company.

As an example, the following composition is incorporated as a beater additive in the preparation of an acid-resistant, wet-strength paper: 100 parts of phenol, 17.7 parts of sodium bisulfite, 10.4 parts of sodium sulfite, 126 parts of formaldehyde (37% aqueous solution), and 50 parts of water (all on weight basis). Prior to addition to the stock, all the ingredients except the water are mixed together and heated at 85-95°C. for six hours. The water is then added, and the sirup is cooled to about 25°; its viscosity on the Gardner-Holdt scale at 25° is X-Y. A bleached kraft pulp is treated with the resin as prepared above, in an amount of 3% of resin solids (based on the weight of dry pulp), together with 3% of alum; the pH of the resulting slurry is adjusted to 4.5. A sheet is formed on a British handsheet machine, and the formed sheet is cured at 105° for one minute and at 123° for 10 minutes. The wet strength of the finished sheet, which has a basis weight of 47.7 lb. (25 × 40—500), is 4.8 lb./inch. E.G.S.

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